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Evolution of the Palms (Terric Haplosaprist) soil in Iowa, 1969 to 2001

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Evolution of the Palms (*Terric Haplosaprist*) soil in Iowa, 1969 to 2001

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Signatures have been redacted for privacy

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LIST OF SYMBOLS AND NOMENCLATURE

The following abbreviations appear in the text and in the appendices.

General
BD – bulk density
CEC – cation exchange capacity
CRP – Conservation Reserve Program
DML – Des Moines Lobe
ISU – Iowa State University
NRCS – Natural Resources Conservation Service
SCS – Soil Conservation Service
SOC – soil organic carbon
USA – United States of America
USDA – United States Department of Agriculture
YBP – Years Before Present
vol. – volume
- number

Units
m – meter
cm – centimeter
ml – milliliter
kg – kilogram
g – gram
mg - milligram
C – Celsius
M – Molar

Texture
M – muck
MSIL – mucky silt loam
S – sand
C – clay
Si – silt
SIC – silty clay
LS – loamy sand
CL – clay loam
SIL – silt loam
SL – sandy loam
L – loam
SICL – silty clay loam

Texture cont.
VCOS – very coarse sand
COS- coarse sand
S – medium sand
FS – fine sand
VFS – very fine sand

Effervescence
NE – no effervescence
VS – very slight effervescence
LS - slight effervescence
ST – strong effervescence
VE – very strong effervescence

Mottles
f - few (<2% of area)
c – common (2 – 20 % of area)
m – many (> 20 % of area)
1 – fine
2 – medium
3 – large
f – faint
d – distinct
p – prominent

Structure
0 – structureless
1 – weak
2 – moderate
3 – strong
f – fine
m – medium
c – coarse
gr – granular
pl – platy
pr - prismatic
sg – single grained

sbk – subangular blocky
bk – blocky

Structure cont.

m – massive
VF – very fine (granular & subangular blocky)
F – fine (granular & subangular blocky)
M – medium (granular & subangular blocky)
VN – very thin (platy)
TN – thin (platy)
M – medium (platy)

Consistence

l– loose
vfr – very friable
fr – friable
fi - firm
vfi – very firm

Boundary

a – abrupt (0 – 2 cm)
c – clear (2-5 cm)
g – gradual (5 – 15 cm)
d – diffuse (>15cm)

Root size

vf – very fine
f – fine
m - medium

Pore size

m – medium
f – fine
vf – very fin

ABSTRACT

Throughout the 20th century, soil surveys have shown Histosols to be extensive across the Des Moines Lobe, which is a Late Wisconsinan glacial surface that covers more than 50,000 km^2 of Iowa and Minnesota. Current anecdotal evidence suggests many Histosols underwent considerable degradation throughout the late 20th century due to human induced lowered water tables and erosion. The objective of the project was to document whether the Palms soils (loamy mixed euic mesic Terric Haplosaprist) have in fact changed over the last 30 years. The Palms series was selected for the study because it is the most common Histosol on the Des Moines Lobe (DML) in Iowa. Field methods consisted of two components. The first was sampling and describing three deep soil cores within a 50 cm radius from of each of 15 national Cooperative Soil Survey (NCSS) typical pedon locations in Iowa. The earliest NCSS pedon was described in 1969 while the most recent one was described in 1999. The second was evaluating the spatial distribution of histic morphology of the Haplosaprist map units. This study has a 31-year timeline for comparison. Key results are all pedons lost histic material with eight sites remaining Histosols and five sites having just histic epipedons. One site now has a mineral epipedon. The mean reduction of histic material thickness was 38.8 cm, and bulk density of histic materials averaged 0.5 $Mg*m^{-3}$. In conclusion, the Palms series has been dramatically degraded over the past 30 years. Extending these results it appears likely that over the next 30 years no Histosols will remain in cropped areas of the DML, or possibly the whole of Iowa.

Key Words: Histosol, soil degradation, subsidence, carbon sequestration, tile drainage.

GENERAL INTRODUCTION

Documenting changes in soil such as decreasing organic matter content and increasing bulk density resulting from farming has global importance to the continued success of agricultural activity (Magdoff, 1992; Doran & Parker; 1994; Lal, 1998; Martin 2002). Documenting these changes in Histosols, soil formed in organic materials, are especially important and relevant for two reasons. First, Histosols are recognized as being significantly more sensitive to degradation than most mineral soils. Second, Histosols are generally highly productive and important on a given farm or even regionally (USDA, 1999; Brejda et. al., 2000a; Brejda et. al., 2000b) while simultaneously serving as concentrated soil organic carbon (SOC) sinks (Reedy & Hodges, 2002; Karmam, 1993; Doran & Jones, 1996). Thus, degradative changes in Histosols results in two general, negative impacts: (a) loss in farm productivity and value, and (b) environmental damage (Henrick and Williams, 1992).

A significant environmental impact of Histosol degradation is a loss of thickness (Everett, 1983) and the release of CO_2, a major greenhouse gas that is linked to increased atmospheric temperatures (Mitsch & Gosselink, 2000; Morris et. al., 2004). This is illustrated by Figure 1, which indicate that over 40 years there was greater than 1 m loss of histic material caused by continued artificial drainage. Potential increases in SOC content within Histosols with restoration of natural hydrology are a likely mechanism for ameliorating the impacts of global warming (EPA, 2002; Reedy & Hodges, 2002). Loss of farm productivity occurs with Haplosaprist degradation for a number of reasons, many of which are tied directly to loss of

SOC content (Doran & Parking, 1994). Specific agronomic impacts of SOC loss regardless of soil order include:

1. decreasing the nutrient holding capacity of soil (CEC)
2. decreasing the pool of nutrients for plants
3. decreasing chelation of nutrients
4. decreasing energy sources for soil organisms such as bacteria to worms
5. decreasing water infiltration
6. increasing evaporation
7. decreasing water holding capacity, especially in sandy soils
8. increasing crusting, especially in fine-textured soils
9. deteriorating aggregation, leaving soil venerable to erosion
10. compaction, increasing bulk density
11. inhibiting root development

(U of MN Extension, 2002; Parent & Caron, 1993; Karmam, 1993).

The purpose of this study is to quantify farming impacts on the Palms soil in Iowa. The Palms was selected because it is the most common Histosol in Iowa and because it is well distributed across the DML. The null and alternative hypotheses are, respectively:

Ho: Farming practices have had no impact on Palms soils since the last NRCS survey.

Ha: Farming practices have degraded Palms soils since the last NRCS survey.

Results from this study have broad implications for Histosols in and beyond Iowa.

LITERATURE REVIEW

History of the Landscape

All landscapes are controlled by their geological history. Iowa's geological history began with continent building during the Precambrian era. Magma cooling at the earth's surface formed igneous rocks. Igneous rocks along with the subsequent evolution of metamorphic rocks formed the base of the North American continent. Precambrian rocks under Iowa vary from 1.4 to 2.5 billion years in age. Through the Paleozoic and Mesozoic eras the central region of the continent was periodically submerged under shallow, warm seas. Arid intervals initiated deposits of salts, gypsum and coal. Remains of calcium bearing animals and precipitates from calcium rich water formed limestone and dolomitic limestone during periods of submergence. These deposits range in age from 600 million to 66 million years (Prior, 1991; Anderson, 1998). Average temperatures were much higher due to the continent's location near the equator. Continental drift was also influencing landscape development. After the continent moved north, changing climate patterns made glaciation possible. The Pleistocene Epoch began midway through the Cenozoic era (2 to 3 million years BP) when multiple glacial advances covered Iowa entirely or partially depositing drift (Anderson, 1998). Both glacial and interglacial periods contributed loess deposits in non-glaciated areas (Prior, 1991 Catt, 1986).

The Des Moines Lobe

The Des Moines Lobe (DML) was created when the Wisconsinan ice sheet advanced from the Keewatin Center and into and across parts of North and South Dakota, Minnesota and

central Iowa during the late Pleistocene epoch. It proceeded in a series of surges beginning just 15,000 years BP and reached its' most southern extent 14,000 years BP, covering previous drift and loess deposits. Figure 2 depicts the extent of the DML in Iowa. The capitol building for the state of Iowa sits atop the Bemis Moraine, which is the DML terminus. Between 14,000 and 12,000 YBP, the ice sheet wasted north to 43° north latitude. During the Holocene, Iowa's climate, flora and fauna were sub-artic with high rainfall and much cooler temperatures during the glaciers most southern advance. With the glacier's retreat, climate conditions changed with less rainfall and warmer temperatures. Deciduous forest and conifers interspersed with grasslands replace the tundra. With continued post glacial warming, prairies and oak savannahs replaced the forest. Today the climate is continental with average temperature and being about 9°C and 80 cm respectively (Table 1). The DML is mapped as the Dows Formation. The Alden Member, Morgan Member, Lake Mills member, and Pilot Knob Member make up the Dows Formation. The DML landscape is one of, recessional moraines, till plains, lake plains and outwash plains. These landforms were distributed across the DML in a systematic pattern although locally they often appear quite random. Irregular ponds and wetlands with ill-defined local watersheds were common within this geologically young landscape. These depressions, also known as "potholes" or "prairie potholes" were hydrologically linked and many had water tables at or above the soil surface in the basin. As Figure 3 illustrates, the DML landform is an important part of the Prairie Pothole Region (Prior, 1991) and the extent of the region in the United States and Canada (USGS, 1999).

During the Holocene epoch (i.e. the last 10,000 yrs.) these potholes underwent two major types of infilling. The first was deposition of sediment from surrounding uplands. Walker (1966) investigated several closed system bogs on the DML in Iowa. He documented that there were two major intervals of erosion and sedimentation. The first occurred when the DML (Cary) Drift was exposed. Post-glacial vegetation suggested by pollen studies consisted of conifers rather than tundra. This initiated a period of stability, spanning 10,500 to 8,000 years BP, when less erosion occurred and organic matter pond filling dominated the bogs. A second interval of erosion occurred between 8,000 and 3,000 years BP. Pollen studies indicate a shift in climate to warmer, drier conditions with vegetation dominated by prairie species (Walker, 1966). Walker and Ruhe (1968) investigated a closed system model of upland erosion and closed lowland sedimentation on the DML. They found sediment and soil trends are systematic in closed hill-slope (pothole) systems and modeled them mathematically.

Subsequently Burras and Scholtes (1987) found Holocene erosion rates to be about 0.7 Mg ha^{-1}. Norton continued to quantify the amount of erosion/deposition and spatial relationships between them on glacially derived surfaces. He used agricultural fields in Indiana to determine post European settlement erosion rates. Alluvium depths overlying sapric materials were used to determine the amount of sediment deposited in closed basins (Norton, 1986). Konen (1999) continued this area of study by quantifying post-European settlement erosion sedimentation of the DML. He determined that "post European settlement to be a time of landscape instability" and that in 127 years 6.3 to 12.2 Mg $ha^{-1}yr^{-1}$ were eroded from uplands on the DML (Konen, 1999). These studies were done in areas with the most

variation in elevation. Basins with gentle slopes and subtle changes in elevation were not as vulnerable to erosion.

During the Holocene, a portion of the basins described above underwent accumulations of organic matter due to the pond filling process. This was prevalent especially during the last 3,000 years. The pond filling sequence is illustrated in Figure 4. Specific conditions must exist before a pond filling cycle can begin. The water table must intersect the soil surface in the depressions or prairie potholes. Hydrophytic and aquatic plants then colonize areas of hydric conditions and open water. Fine sediment and detritus from plants settle to the bottom of the ponds or potholes. Aerobic microbes use up the available oxygen in the water column as they decompose the organic materials. Thus, the depression bottoms become anaerobic. Organic matter continues to accumulate at a rate exceeding anaerobic decomposition causing the water depth to decrease. The depression fills until the surface is above the water table. If the prairie potholes experiencing the pond filling cycle are left undisturbed, the former depression will develop into a wet meadow or wet prairie (Everett, 1983). The soils that form once more than 40 cm of detritus accumulates as a result of this process are classified as Histosols (Soil Survey Staff, 1999).

Histosols

Soil Taxonomy (1999) identifies the central concept of Histosols as soils formed from organic materials. More specifically, the minimum organic carbon content of Histosols is 12% (wt/wt) and this minimum increases proportional to clay content. Alternatively, histic epipedons have a minimum organic carbon content of 8.0% (wt/wt). As with Histosols, that

minimum increases proportional to clay content. For the purpose of this thesis, the histic epipedon criteria was used to determine if a soil was or was not a Histosol. This more liberal approach was used in order to meet the common perception of "thick O horizons" are equivalent to a Histosol. It is also consistent with standard soil survey practices in mapping the Palms series.

Additionally a soil without permafrost is classified as a Histosol if half or more of the upper 80 cm is organic. A soil is also classified as a Histosol if the organic materials rest on rock or fill or partially fill voids in fragmental, cindery or pumiceous materials. If the bulk density is very low, less that 0.1g cm^{-3}, (0.1Mg ha^{-1}) three-quarters or more of the upper 80 cm must be organic (Soil Survey Staff, 1999).

Histosols have four suborders. Folists have O horizons of leaf litter, twigs and branches resting on fragmental material. Fibrists consist of slightly decomposed organic material such as sphagnum moss. Fibrists contain more than 2/3 fibers after rubbing. Hemists consist of moderately decomposed organic materials and contain 1/6 to 2/3 fibers after rubbing. Saprists consist of highly decomposed organic materials and contain less than 1/6 fibers after rubbing. All Histosols - except some Folists - are hydric soils (USDA NRCS, 2004). As such they are protected from some artificial drainage unless prior land drainage such as for agriculture has occurred.

Histosols are fragile soils that are subject to subsidence, deflation and rapid decomposition with artificial drainage and/or converted to agricultural use. Subsidence encompasses several

processes. The first process is settlement or the loss of buoyancy as ground water levels drop. The second process is shrinkage; structure collapses of due to capillary forces. And at least in some definitions (e.g., see Everett, 1983), the thirds process of subsidence is mineralization (decomposition) of organic matter into methane, carbon dioxide and nitrogen compounds, which leads to a loss of volume and mass. Other definitions of subsidence exclude decomposition and mineralization. For the purposes of this thesis, subsidence will generally be used in its broadest sense. Deflation occurs when a bare soil undergoes desiccation, followed by wind blowing the dry, low density, particles. Desiccation also drastically and irreversible alters soil colloid properties (Everett, 1983; Brady and Weil 2002). Figure 1 illustrates the impact these processes have on histic material thickness.

Impact of European Settlement

The United States (USA) obtained the land that was to become Iowa as part of the Louisiana Purchase of 1803 (ICLPE, 1904). By 1860 the USA had opened the DML area to settlement (Dahl & Allord, 1999; Pavelis, 1987). The Prairie Pothole region lay directly in the path of the westward expansion of the 1880's. USA policy at that time encouraged drainage enterprises in both the public and private sector for all potentially productive land.

Land drainage has been practiced for longer than written records have been kept. Miles (1899) wrote, "Cato, who wrote in the second century before the Christian era, gave the first specific directions for draining that we are acquainted with, but there is evidence that extensive embankment and irrigation works for the control of water in the interest of agriculture were made by the ancient Egyptians and Babylonians many centuries before his

time." John Johnson is credited with introducing farm drainage in the United States (Weaver, 1964). Drainage of agricultural lands was the subject of many publications through the first half of the 20th century (Klippart, 1867; Miles, 1899; Jones, 1908; Kendall, 1950; Luthin, 1957). Investigations to improve drainage technology and understand the underlying physical mechanisms at work continue today (e.g., Skaggs and Van Schilfgaarde, 1999).

In the case of the DML, easily drained potholes were converted rapidly to farmland. By 1950 large areas were enrolled in public and private drainage enterprises (Figure 5). Drainage of these areas continued and continues today with 10,000's of km of tile being annually added across the DML yearly. As a result - and unsurprisingly - 95% of Iowa's wetlands, including most of the Histosols, have been drained (Figure 6).

MATERIALS AND METHODS

Description of Study Area.

The location of all of the study sites are schematically shown on Figure 7. As previously discussed, each site is located on the DML, which occupies approximately 6,255,000 hectares of north central and central Iowa (Simonson et al., 1952). The DML consists of Late Wisconsinan drift with much of its uplands composed of Dows Formation till. (Prior 1991; Anderson, 1998). The maximum age of the till surface is 12,500 to 14,000 years old (Ruhe, 1969). Across the DML uplands there is a mosaic of closed depressions with subsurface interconnections. Relief commonly varies from 1 to 6 meters (Prior, 1991). Average yearly temperature varies between 7 to 9 °C and annual precipitation ranges from 67 to 84 cm (Table 1).

Study Soil

The Palms soil was selected for this study because it is the most extensive Histosol on the DML and in Iowa as a whole (C. Lee Burras, 2004. Personal communication). Due to revisions and reorganizations occurring within the NRCS and the NCSS it is likely many Palms soils within northern Iowa will be reclassified as Klossner soils. The key difference between the two series is the Klossner has an A horizon immediately below the organic horizon- mineral horizon contact. The Klossner series was formerly included in the Palms series (USDA NRCS Soil Survey Division, 2001). For the purpose of this research, this difference is immaterial. Both series are loamy, mixed, euic, mesic Terric Haplosaprists.

Thus, all subsequent discussion in this thesis will refer only to the Palms series although it is recognized this project is in many ways equally about the Palms and the Klossner series.

Palms soils occur in upland depressions, former pond/lake beds, upland drainways and stream benches (Table 2). They are commonly found adjacent to Okoboji, Harps, Canisteo, Calcousta and Crippen soils. Drainage is very poor and permeability is moderate. Ponding is a common problem for agricultural use (USDA NRCS, 2001; USDA NRCS, 2003). Figure 8 shows an example of ponding on Palms soil in Winnebago County. Tile installation and maintenance can be problematic due to subsidence and the low relief of the landscape (e.g., see DeWitt et al, 1984). Subsidence misaligns tile as the soil level drops and low relief makes it difficult to find areas low enough to receive drainage water (Figure 9).

Soil Sampling Methods

Fifteen counties on the DML in Iowa were selected for study. Each county has a modern soil survey that includes the description of and location for its Palms representative pedon. The soil map unit for each of these 15 representative pedons was visited although only 14 pedons could be collected. The Story County Palms could not be sampled due to road building activities and multiple buried utilities at the location of the pedon.

Each representative pedon site was located using a surveyor's tape, compass and the location provided in the respective soil surveys (Table 2). Figures 10 through 24 are aerial maps for each site with the pedon site approximately identified. One "central" pedon was collected from each representative pedon site. Each central pedon consisted of three cores one meter

or more in depth taken from within a 0.50 m radius of the representative pedon location. Each core was collected via soil coring with a truck mounted hydraulic probe unit using a 0.05m or 0.08m coring tube (Figure 25). The appropriate soil map units in Cerro Gordo, Story and Wright Counties were also sampled with perpendicular transects using 50 meter interval. One transect was oriented to cross the widest extent of the soil map unit and through the representative location. The other was located at a 90°angle to the first. Figures 26, 27, and 28 illustrate transect locations on aerial photographs. The soil cores from these transects are referred to as "transect pedons" in order to differentiate them from the central pedons.

Site histories were gathered, where possible, using a questionnaire. Nine owner/operators responded to the questionnaire. Queries included history of ownership, drainage information, observed erosion, agricultural productivity, management issues and facts of interest.

Pedon Descriptions

Cores (pedon) were described at the Iowa State University (ISU) Pedometrics Laboratory using the terminology of Schoeneberger et. al. (1998). Histic materials will be reported as horizons instead of tiers for simplicity sake. All of the sites excluding the Boone central pedon were evaluated with the Von Post Decomposition Scale. The Von Post Decomposition scale was developed to evaluate the level of decomposition of organic materials (Everett, 1983). Cores were photographed and described in detail. Properties examined were horizon depth and boundary characteristics, field moist matrix color using a Munsell color book, soil texture using hand estimates, visual estimate of percentage

redoximorphic features, structure, shape, grade and type of individual peds and well as coating, concretions, consistence, effervescence, visual estimation of the volume percentage of roots, and hand estimation of percentage fiber by volume. Appendix B provides additional descriptions. Horizons were used as samples for laboratory analysis.

Laboratory Analysis

Laboratory analyses included bulk density, pH, total carbon, total nitrogen, loss on ignition (LOI), particle size analysis (PSA), chromometer color and, carbon dioxide evolution. Bulk density was measured for all samples using the core method (Soil Survey Staff, 1996). All measurements were completed on oven dried (24 hours at 105°C) samples. A vernier caliper and a tape measure were used to measure the diameter, which was approximately 0.05m or 0.08m depending on the coring tube used, and the length, respectively, of each sample. All lengths and diameters were recorded.

Next each sample was dried and then ground to pass through a 2mm sieve. The ground samples were analyzed. Soil pH was determined for all samples using a 1:1 water to soil dilution (Soil Survey Staff, 1996). Total carbon and total nitrogen content were analyzed using the dry combustion method with a Leco LC2000 on <2 mm samples using the protocol of the Soil Survey Staff (1996) and the ISU Soil Testing Laboratory (Brian Hill, 2004. Personal Communication). Organic carbon was considered to equal total carbon in all samples that had pH at or below 7.0. Those samples that were calcareous (pH 7.0 and above) were adjusted using an organic carbon - loss on ignition (LOI) soil organic matter relationship, which was developed as part of the results of this project. LOI soil organic

matter was determined for all samples having greater than eight percent total carbon by weight using the method described in Soil Survey Staff (1996) and Konen et. al., (2002).

Particle size distribution was attempted on the ash remaining after LOI from high total carbon samples. The pipette procedure was used (Soil Survey Staff, 1996). Chromometer color was determined following Konen (1999). Carbon dioxide evolution was determined using treatments of varying nitrogen input and moisture content using a modified dynamic method using composite samples from three geographical areas (Weaver, 1994; Loynachan, 2003). Table 3 details the composite samples used in the carbon dioxide evolution study. Statistical analyses used are from Cochran (1983) and Rosenbaum (2002).

RESULTS AND DISCUSSION

Current Use and Oral History

Thirteen of the sites are currently used for row crop production. The Clay County site is growing warm-season perennial grasses ("in CRP") and the Boone County site is a pasture (Table 1). Oral histories were gathered from nine of the sample sites (Table 4). The nine respondents had access to oral and/or written histories passed down from family members and neighbors. A general summary of their observations about their Palms sites include the following points:

- Managing Palms soils was and remains challenging.
- The first trenches to drain these sites were hand dug and used locally manufactured clay tile.
- Drainage was problematic with tile failures common within the first few years.
- Original tile lines have been replaced and new tile lines continue to added in order to maintain adequate drainage for crops.
- Field operations such as cultivating dislodge very aggregates that become air-born and irritate skin and mucus membranes due to their abrasiveness and pH.
- Wind erosion explains a large part in the loss of the organic material of, at least, the Boone site, which was converted from pasture to a tilled and planted field in 1983, which was a drought year in Iowa. Wind storms that year significantly eroded the site. A family member living about 0.5 km from the site recalls that clothes hung on the line to dry had to be rewashed several times during storms because of histic material being blown onto the clothes.

- Fire was has been and likely remains management issue. Fires smoldering in Palms soils have been known to burn for months. Sometimes they burned until snow cover extinguished the fire.
- Land use and especially crops have changed drastically over the years. Circa 1900 grasses and legumes were extensively grown as fodder for draft and other livestock. Both the forage and the livestock have nearly vanished from the DML. Small grain and vegetable production were common in the early to mid 20th century. Wheat, oats, rye, grain sorghum, and field corn were all locally grown cereals. Potatoes tomatoes, onion cabbage and beets were grown on some Palms at least as noted in Stevenson and Brown (1924). Sweet corn, carrots, peas and other truck crops were commonly grown in the mid 20th century. Their market was to one of the several canaries that operated at that time in the northern counties of Iowa. This diversity of crops has given way to corn and soybeans.

Pedon Descriptions

Pedons for the most part consisted of sapric materials (O horizons) over drift. The O horizons generally had very low fiber content with most having between zero and 2% fibers. Beyond this single unifying observation, few other morphologic characteristics are shared across the range of pedons, even though they all belong to the same series. This wide range of characteristics is true when comparing across central pedons and when comparing across transect pedons (Table 5). These pedons have underlying mineral horizons having textures ranging from clay to gravel. Eight central pedons (Boone, Clay, Emmet, Franklin, Hancock Polk and Wright) had argillans and organans. Two central pedons (Humboldt and Palo Alto)

had only organans. The Winnebago central pedon had only argillans. Central pedons from Kossuth, Cerro Gordo and Worth Counties had neither organans nor argillans.

The pedologic ramifications of the organans and argillans are especially noteworthy and surprising. It is speculated that translocated organic and clay colloids may be forming an A horizon - or possibly even an incipient spodic or argillic horizon - in the mineral zone immediately below the histic horizon. The mechanism whereby this happens is thought to include two components. First, the artificial drainage (i.e., tile lines) has lowered the water table sufficiently to permit net downward water flow of rainwater during heavy storms. Second, oxidation of histic materials causes soil pH in the lower solum to become adequately acidic to disperse clays and the decomposing (and increasingly finer sized) organic colloids, which - like colloidal clay - make these considerably more susceptible to lessivage (Arnold, 1983; McKeague et al., 1983; Rust, 1983).

Snail shells were present in six central pedons. Each had sola with pH 7 or above which is not surprising given snail shells are aragonite or some other carbonate mineral (Ruhe, 1969). Four central pedons had noticeable odors. The ones in Clay, Humboldt and Winnebago Counties had a mild compost like odor while the Worth County central pedon had a distinct sulfur odor. Interestingly it, Worth County central pedon, had thick histic materials (well over 100 cm) overlying very acidic horizons that contain needle shaped, clear crystals (gypsum). On the opposite spectrum of the soil pH scale, carbonate masses were present in the underlying mineral horizons of seven central pedons. Those higher pH sites were in Boone, Cerro Gordo, Clay, Emmet, Franklin, Hardin and Wright Counties.

Eight central exhibited both redox concentration and depletion features in the mineral horizons while the central pedons from Cerro Gordo, Clay and Worth County had only redox concentration features. The Kossuth central pedon exhibited gleying only. Given the unquestionably reducing conditions wherein the original Palms soil formed, it is interpreted that differences in redoximorphic features between pedons reflects the extent to which oxidation has occurred following drainage. And while it is beyond the scope of this thesis an interesting follow up project would be to examine the relationship between redox features and the duration of artificial drainage and distance to tile lines.

Visible plant fragments were identified in the Hancock, Hardin and Worth central pedons. These fibers disintegrated with gentle rubbing. According to Everett (1983), this indicates they were extremely fragile plant fragments. These three central pedons rated R_3H_9 with the Von Post Decomposition Scale. The remainder of the central pedons had no visible plant parts and were rated at R_3H_{10} (Everett, 1983). The rarity of visible plant fragments in all of these pedons was not surprising given the known sapric characteristics of the Palms. That is, the Palms is a Haplosaprist. Thus, this study was designed to only investigate pedons known to be formed in highly decomposed organic materials although it was initially speculated that, perhaps, the two pedon sites in perennial grasses would include at least a thin horizon of fibric materials.

Perhaps most importantly only eight of the 14 central pedons met the organic material thickness and the (relaxed - see pages 6 to 7) organic carbon content criteria for being a Histosol. All of them had organic materials that contained eight or more percent organic

carbon by weight and that were 40 cm or more thick. They are the ones from Cerro Gordo, Franklin, Hancock, Hardin, Humboldt, Winnebago, Worth and Wright Counties. Interestingly, these counties are clustered in the central to eastern region of the DML in Iowa. Five of the six remaining central pedons no longer have had the thickness of their organic materials reduced to the point where they have only histic epipedons. These pedons were located in Clay, Emmet, Humboldt, Kossuth and Palo Alto Counties. The Boone central pedon had no horizon of organic material. Current subgroup classifications of the 14 central pedons are given in Table 6.

Interpretation of Laboratory Results

Average pH of individual pedons ranged from 4.8 to 7.5 for central pedons and 7.0 to 7.2 for transect pedons. These ranges are consistent with those given in NRCS representative descriptions for Palms and their geographically associated series. Average total carbon content ranged from 0.75 % to 27.80 (wt/wt) for central pedons. Average total carbon content ranged from 0.42% to 29.50% (wt/wt) for transect pedons. The average total carbon content of all central pedons was 7.36% (wt/wt) and average for all transect pedons was 6.47% (wt/wt). When only organic horizons are averaged, the total carbon contents ranged from 9.40 to 27.80% (wt/wt) for central pedons. The mean total carbon content for all organic horizon from transects is 15. 26% (wt/wt).

The average bulk density of O horizons ranged from 0.3 Mg m^{-3} to 0.7 Mg m^{-3} for central pedons and 0.1 Mg m^{-3} to 1.9 Mg m^{-3} for transect pedons. The occasional very high bulk density in organic horizons (e.g., 1.9 Mg m^{-3}) is likely due to compaction during coring

and/or volume measurement errors. The mean of the average O horizon bulk densities were 0.4 Mg m^{-3} and 0.4 Mg m^{-3}, respectively, for all central and transect pedons.

In order to convert the highly accurate LECO determined total carbon contents into the more important organic carbon - or at least organic matter - contents, LOI organic matter contents were determined on any soil sample that had 8.0 or more total carbon content. The 8.0 total carbon content was the cutoff because it is the minimum organic carbon content required for a histic horizon (see discussion on pages 6 and 7). Next the relationship between LOI-organic matter contents and LECO organic carbon contents was determined by determining the best-fit least squares relationship on soil samples with pH of 7.0 or less (see Figure 29). In other words, given that total carbon and organic carbon are synonymous in soil samples lacking carbonate minerals and that carbonate minerals result in soil pH values greater than 7.0, it was possible to use the approximately 40 acidic soil samples to quantitatively determine the LOI-OM% and LECO-OC% relationship. As Figure 29 shows, this relationship, with 79.66% accuracy, is

$$\text{LOI-OM\%} = 1.879(\text{LECO-OC\%}) + 5.8497.$$

This relationship was used for those pedons having high soil pH to determine whether they in fact do have histic epipedons.

Average clay content of LOI-ashed samples ranged from 4.6% to 12.2 % for central pedons and 2.8 % clay to 7.5 % clay for transect pedons (Table 7). These clay contents are thought

to have little meaning given it is speculated that the high temperatures and resulting organic matter combustion during LOI aggregated much of the clay fraction into silt sized quasi-bricks.

Carbon dioxide evolution for all composite samples ranged from 12.4 mg to 116.6 mg per 50 grams of soil per week. Carbon dioxide evolution for all composite samples ranged for all from 82.6 mg to 198.4 mg per 50 grams of soil per week. Figures 31 through 34 provide graphed carbon dioxide evolution values. Treatment with different amounts of nitrogen did not influence the carbon dioxide evolution of the soils indicating there was adequate nitrogen for microbial activity without adding nitrogen fertilizer to the soil. Moisture content did influence carbon dioxide evolution. Air dry soil produced little carbon dioxide but when moisture content increased the same sample evolved more carbon dioxide.

Returning to considering the Palms as entire pedons, it is important to remember the elapsed time between NRCS descriptions and this study ranged from 8 to 31 years. During this time period all of the Palms soils lost thickness. For the all of the central pedons, individual rates of loss ranged from 0.9 cm to 4.3 cm per year. The average for all central pedons was 2.9 cm per year (Table 8 and Figure 35). Given as a percent reduction (denominator being the original O horizon thickness), the loss ranged from 10% to 100%. It averaged 37% for all central pedons (Table 8 and Figure 36). Two of the three transects have clearly less area classified as Haplosaprist soils than mapped in the soil surveys (Figures 37 to 39).

The consistent loss of organic materials across Palms pedons is thought to be due to deflation (i.e., wind erosion), accelerated rates of organic matter mineralization, and compaction/consolidation of organic materials. According to Everett (1983), these processes can largely be lumped in "secondary subsidence". This was previously discussed when Figure 1 was explained. As that figure and discussion explains, artificial drainage of Histosols results in an initial rapid decrease in thickness (primary subsidence) followed by a slower more linear pattern of secondary subsidence. Figure 40 also illustrates the linear nature of secondary subsidence in California. It is speculated over the past 30 years some of the pedons studied had a resurgence of primary subsidence due to the installation of additional drainage tile. Regardless of the exact mechanism or mechanisms, it is clear that the Palms soils have steadily been losing thickness of organic materials (Figure 35).

Conclusions and Ramifications

Farming had - and likely continues to have - a significant impact on the degradation of the Palms pedons examined in this study. Specifically, only about one-half of the pedons examined remain Histosols due to their having, on average, lost about 3 cm of histic materials per year. This substantial loss of organic matter has contributed a disproportional amount of greenhouse gases to the atmosphere when compared to mineral soils. By extension this strongly suggests that farming has negatively impacted all Haplosaprists and, in all likelihood, Histosols. Of course, on the plus side the draining of those Histosols resulted in numerous high value vegetable and row crops being produced in the past and today. Furthermore, Histosols - and sites of former Histosols - may provide potential carbon

sinks if natural hydrology is restored. Doing so simply requires wetland restoration. Its potential as a means of greenhouse gas mitigation is intriguing.

FIGURES

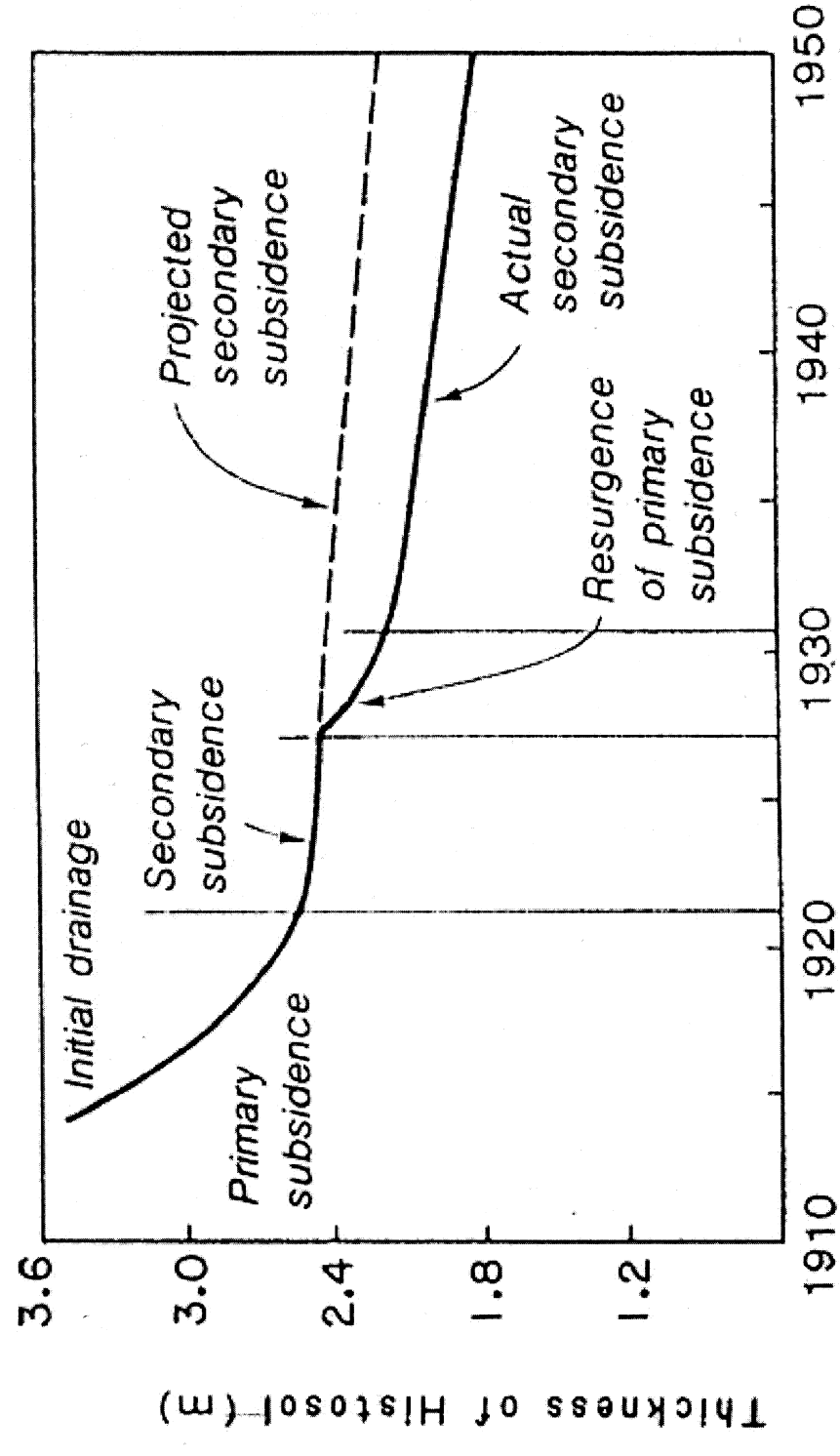
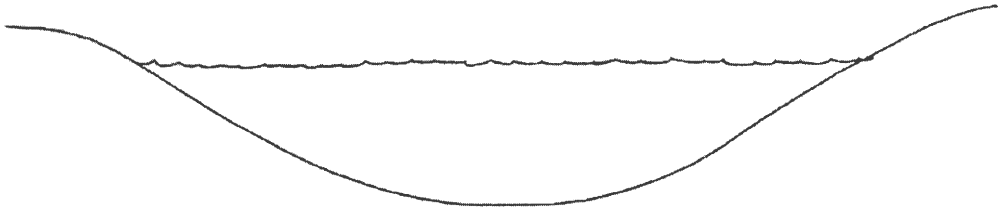


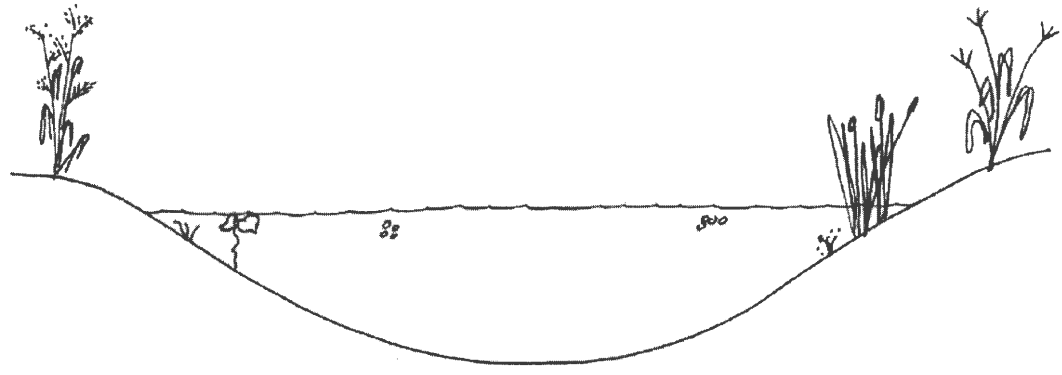
Figure 1. Primary and secondary subsidence of a Florida Histosol (Based on Stephens, 1956). *Modified from Everett, 1983.*

Figure 2. Landform Regions and Surface Topography of Iowa. (*Source* igsb.uiowa.edu/browse/geoiowa/geoiowa.htm *accessed 04-05-04)*

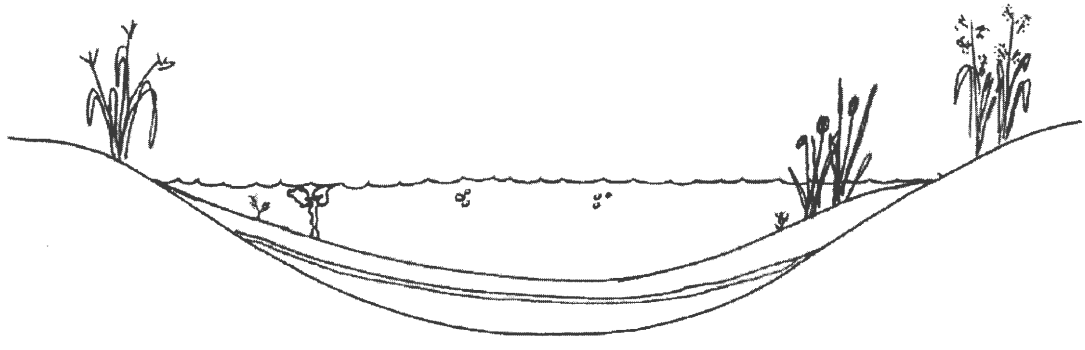
Figure 3. Extent of the prairie pothole region. *(Source from http://www.npwrc.usgs.gov/resource/1999/pothole/prairie.htm)*



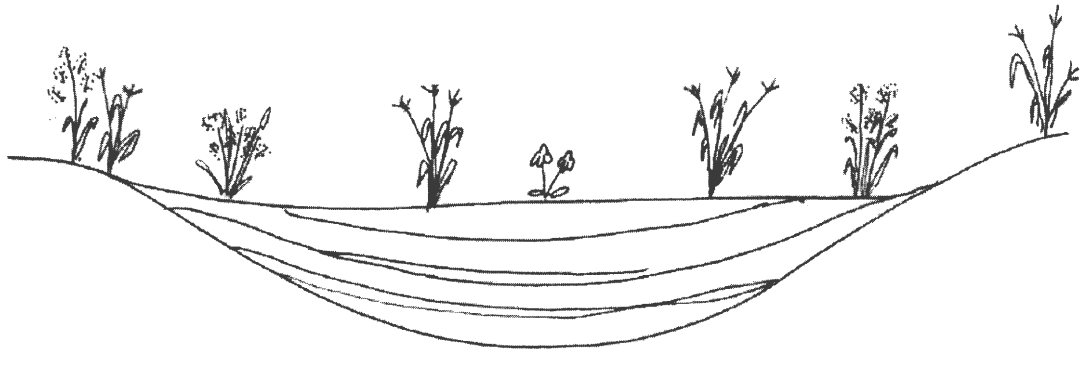
Depression before pond filling begins.



Colonization by hydrophytic plants.



Accumulation of organic matter.



Wet meadow.

Figure 4. Pond Filling Cycle. Adapted from Wilding, Smeck and Hall, 1983.

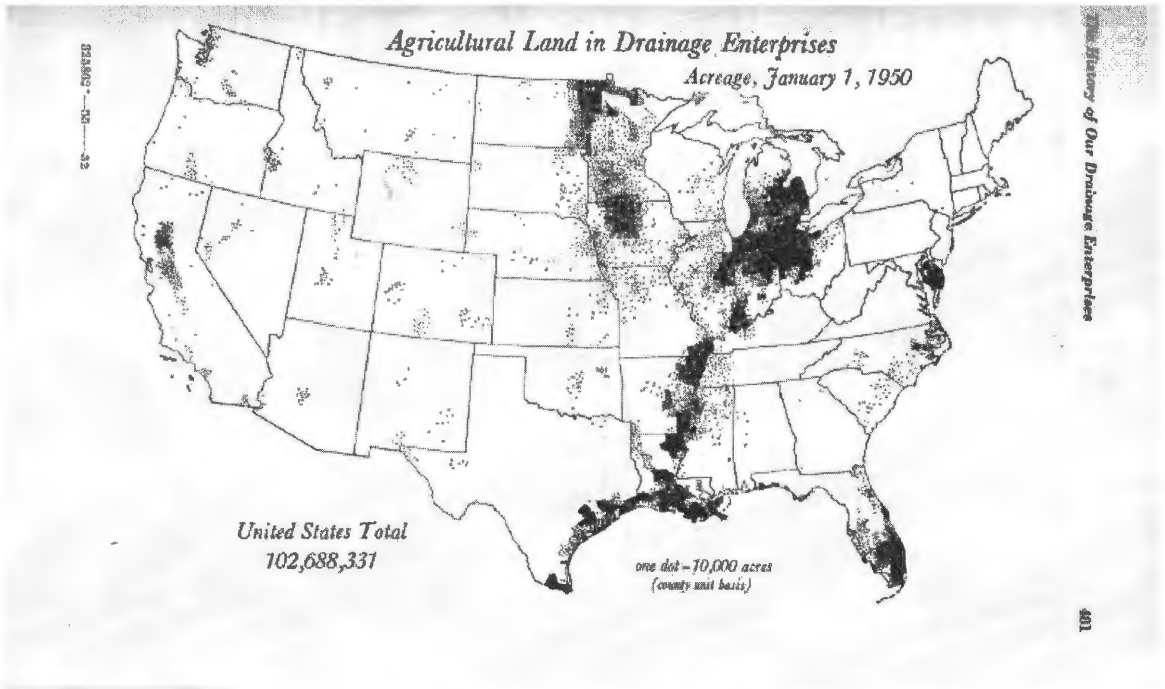


Figure 5. Agricultural Land in Drainage enterprises in January 1950
(Source Modified from Water the Yearbook of Agriculture 1955.)

Figure 6. States with notable wetland loss, 1780's to mid 1990's *(Source http://water.usgs.gov/nwsum/WSP2425/history.html accessed 04-05-04 also Modified from Dahl, 1990)*

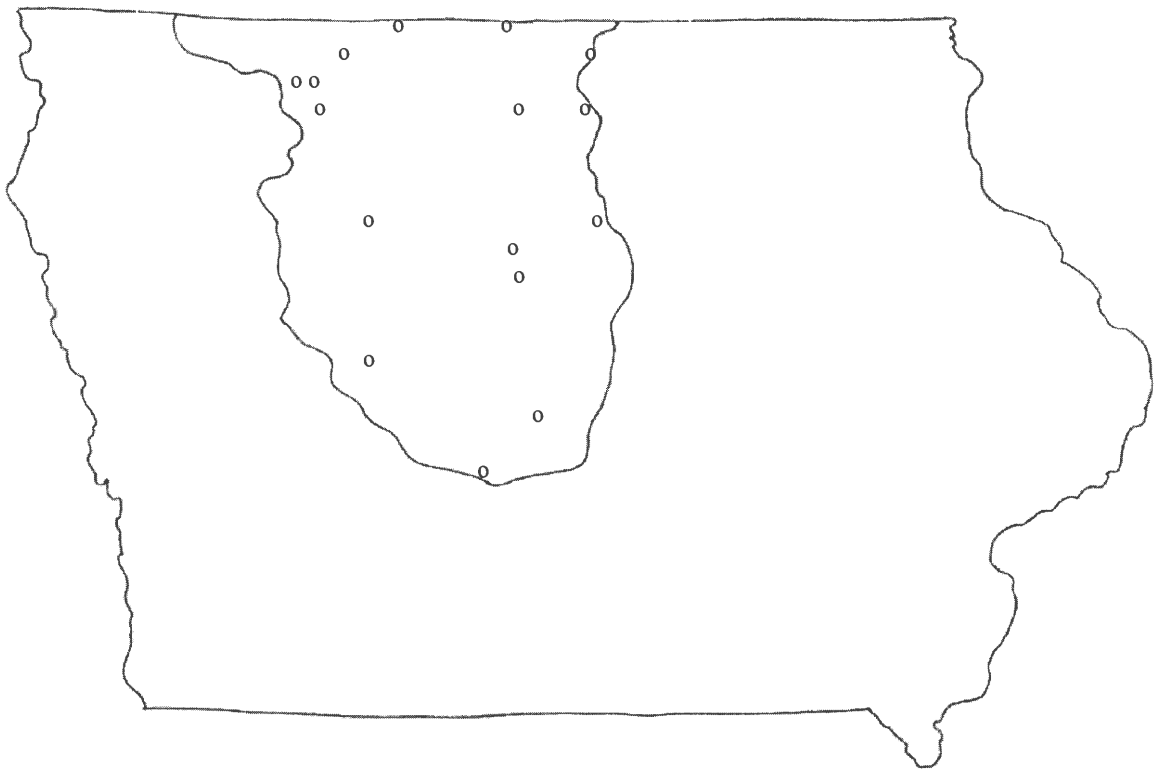


Figure 7. Location of study sites on the Des Moines lobe, Iowa.

Figure 8. Ponding on Palms series soil in Winnebago county Iowa. The Palms representative pedon site north of the flag circled in the bottom center of the photograph. Photographed by Beth Larabee.

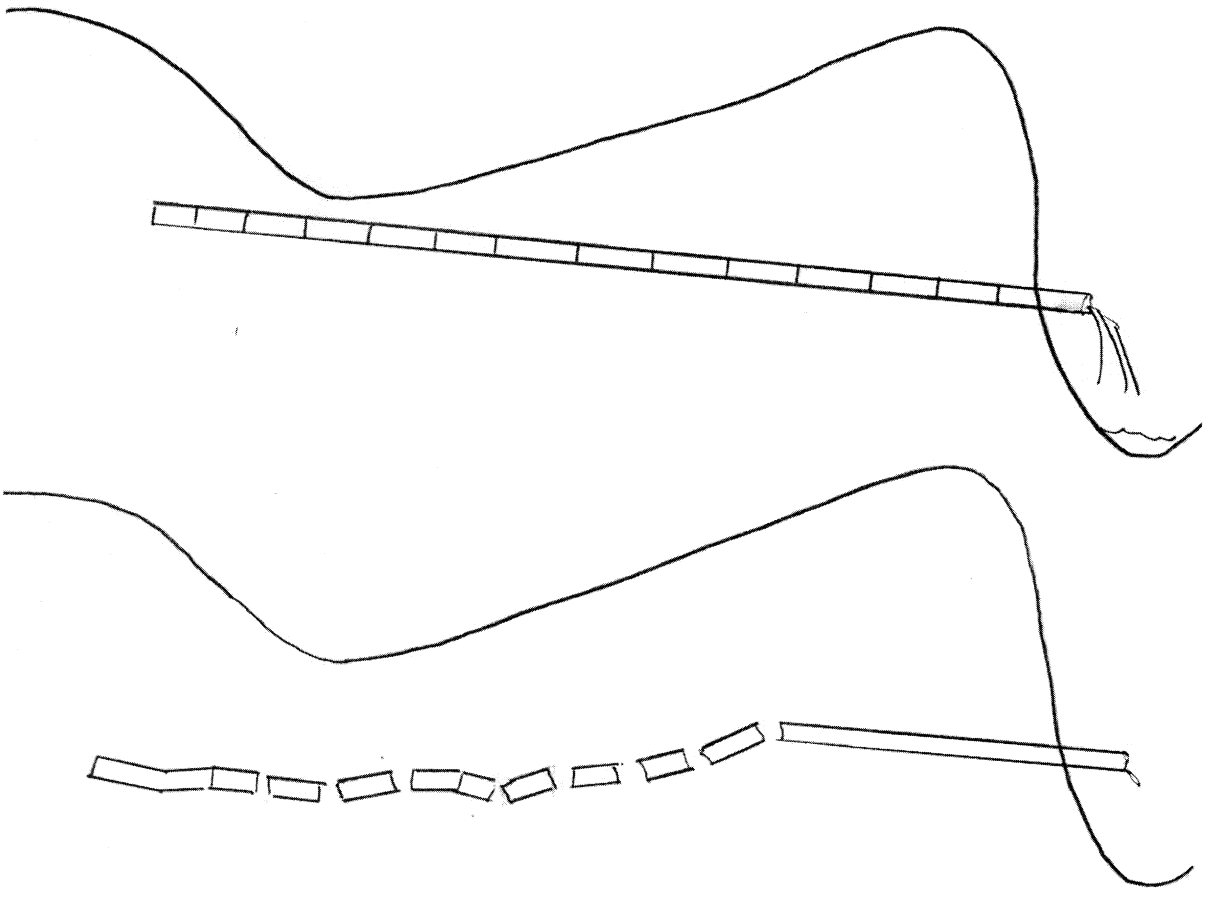


Figure 9. Tile failure due to subsidence. As the material below the tile decomposes, the tile change elevation and orientation. Tile alignment is disrupted and the artificial drainage no longer functions.

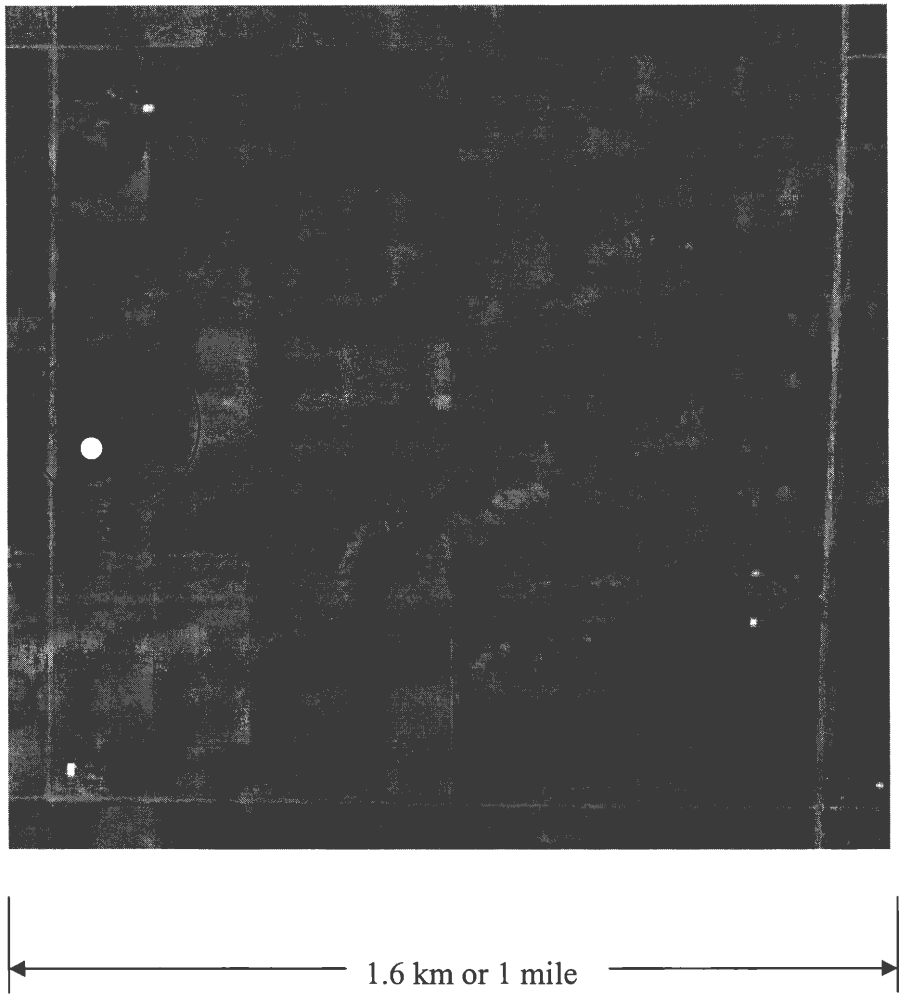


Figure 10. Aerial photographs of Boone County pedon location. The circle indicates the area of Haplosaprist and the dot indicates the pedon location.

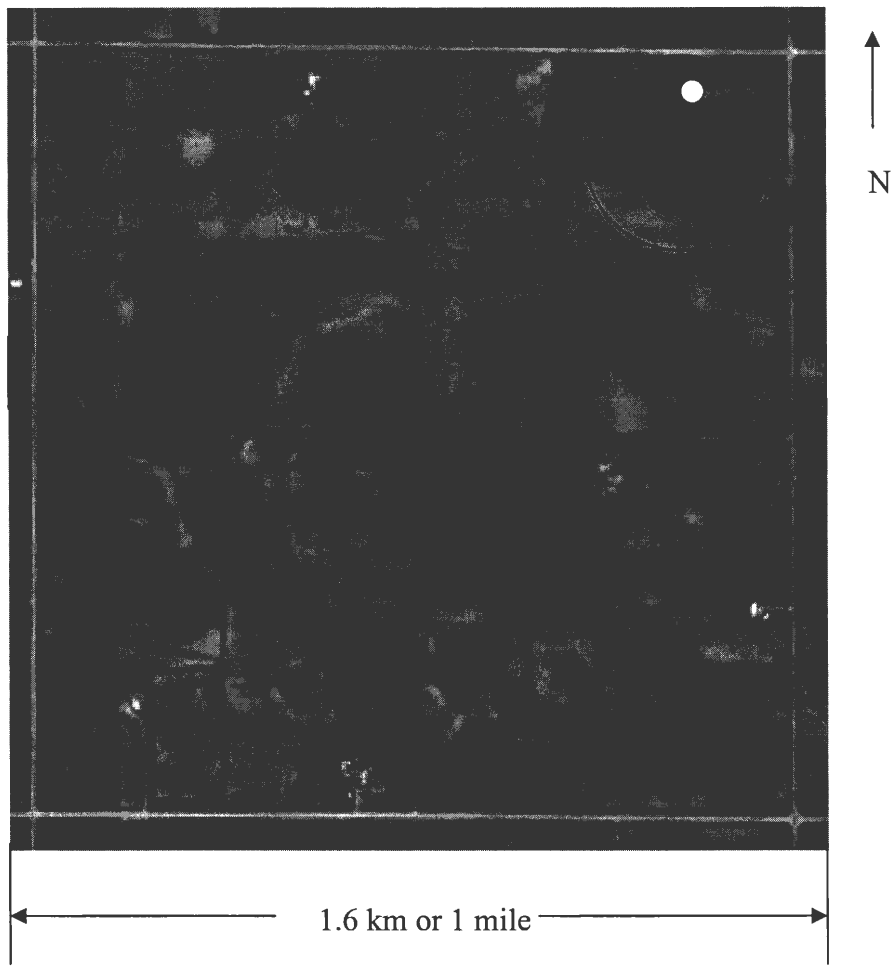


Figure 11. Aerial photographs of Cerro Gordo County pedon location. The circle indicates the area of Haplosaprist and the dot indicates the pedon location.

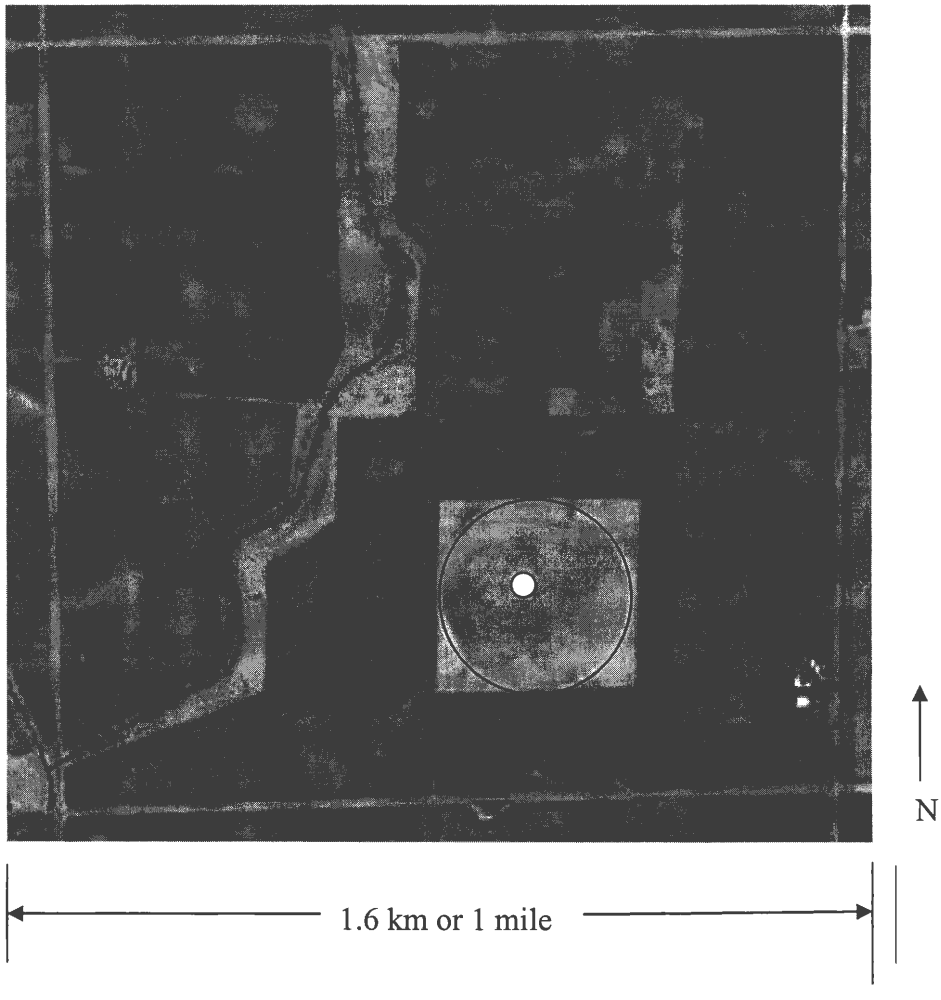


Figure 12. Aerial photographs of Clay County pedon location. The circle indicates the area of Haplosaprist and the dot indicates the pedon location.

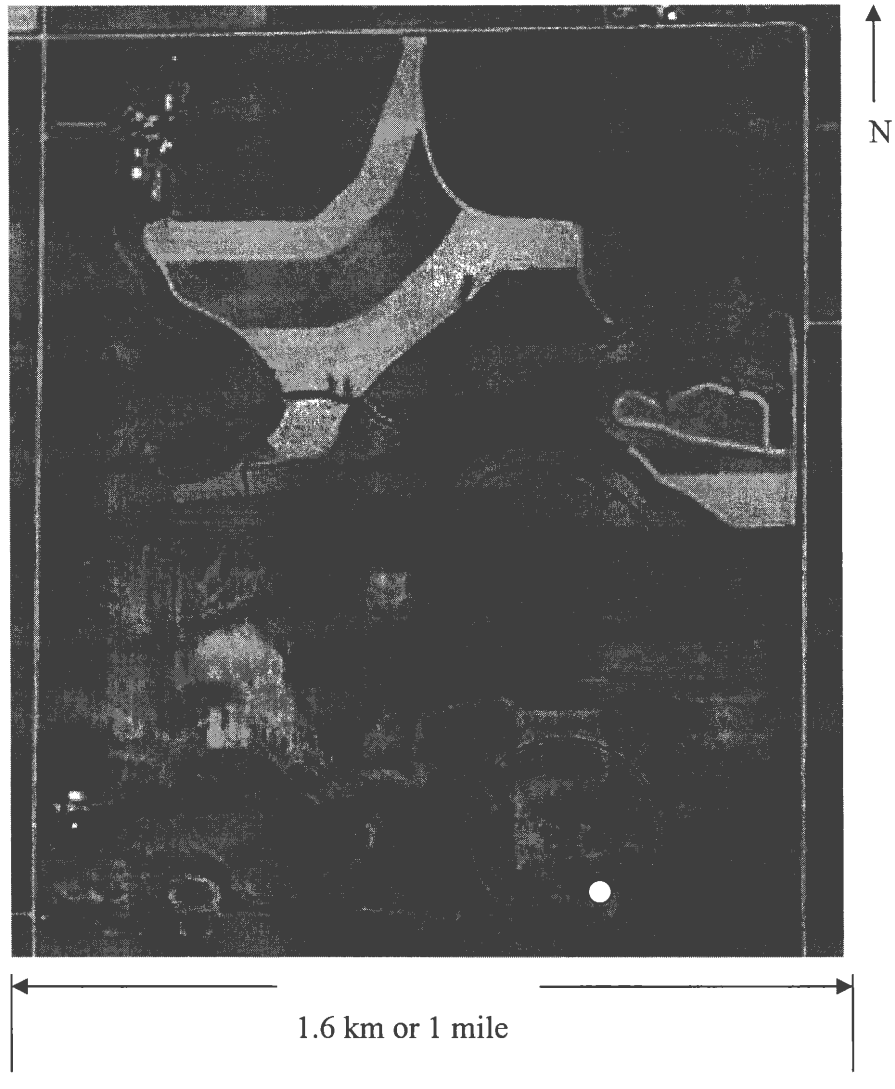


Figure 13. Aerial photographs of Emmet County pedon location. The circle indicates the area of Haplosaprist and the dot indicates the pedon location.

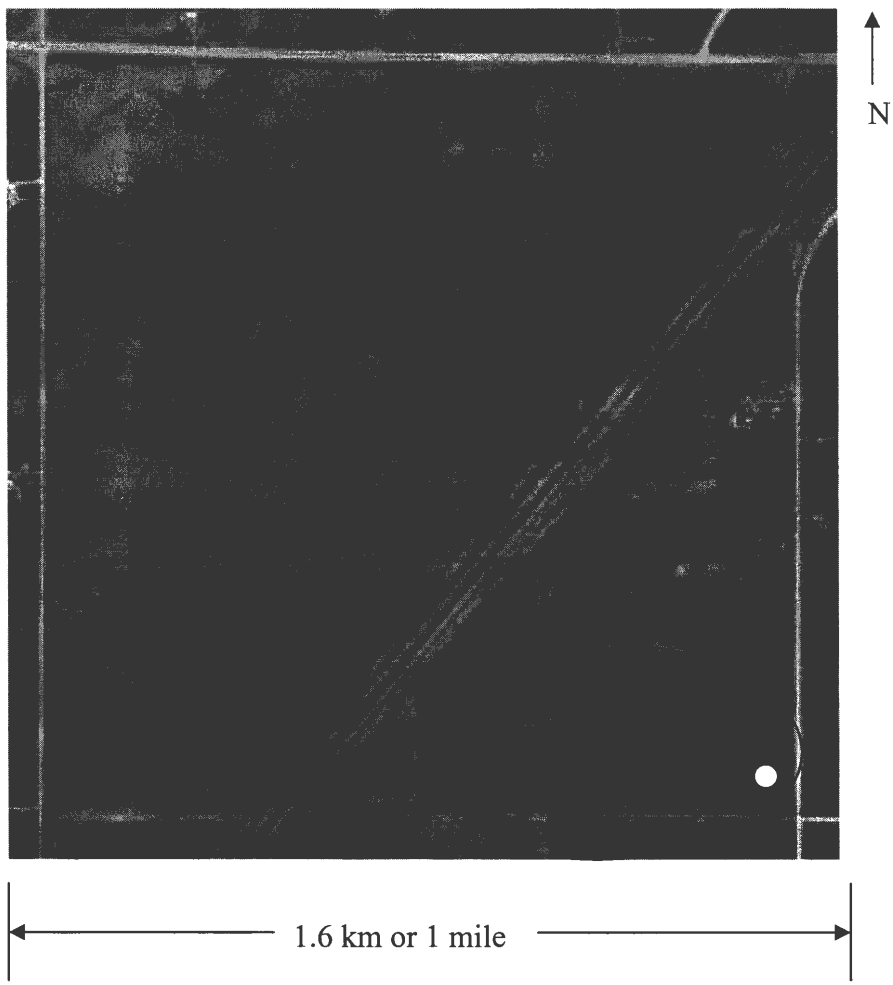


Figure 14. Aerial photographs of Franklin County pedon location. The circle indicates the area of Haplosaprist and the dot indicates the pedon location.

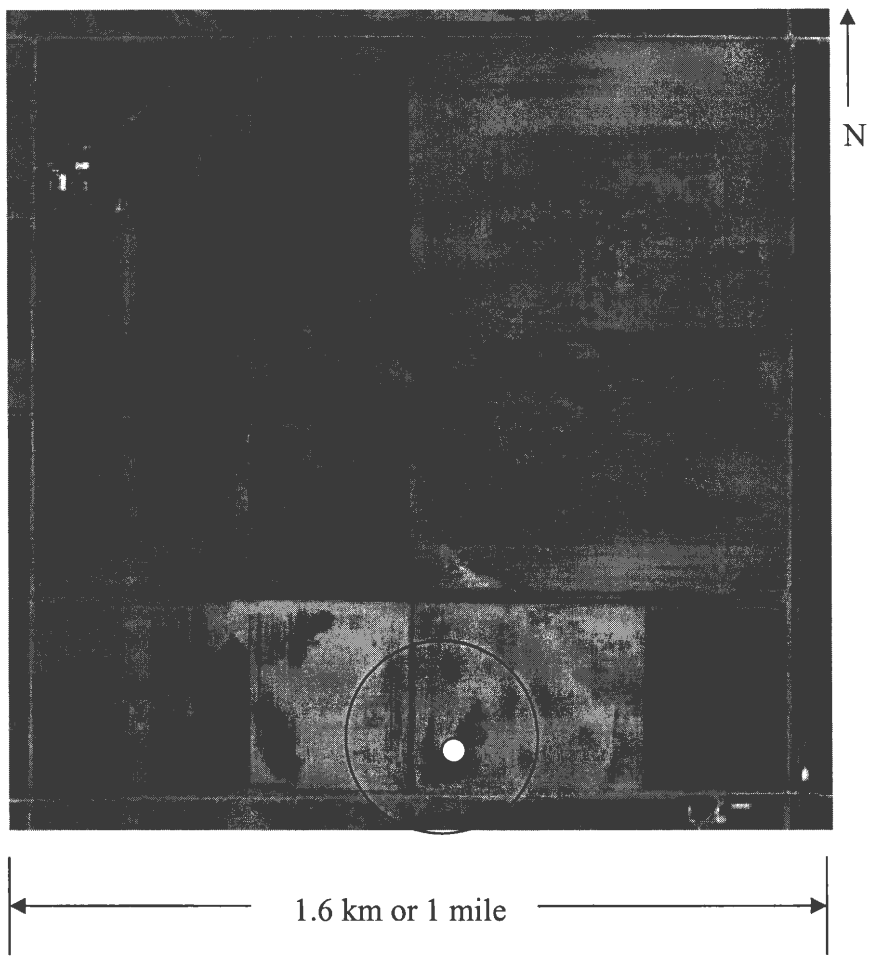


Figure 15. Aerial photographs of Hancock County pedon location. The circle indicates the area of Haplosaprist and the dot indicates the pedon location.

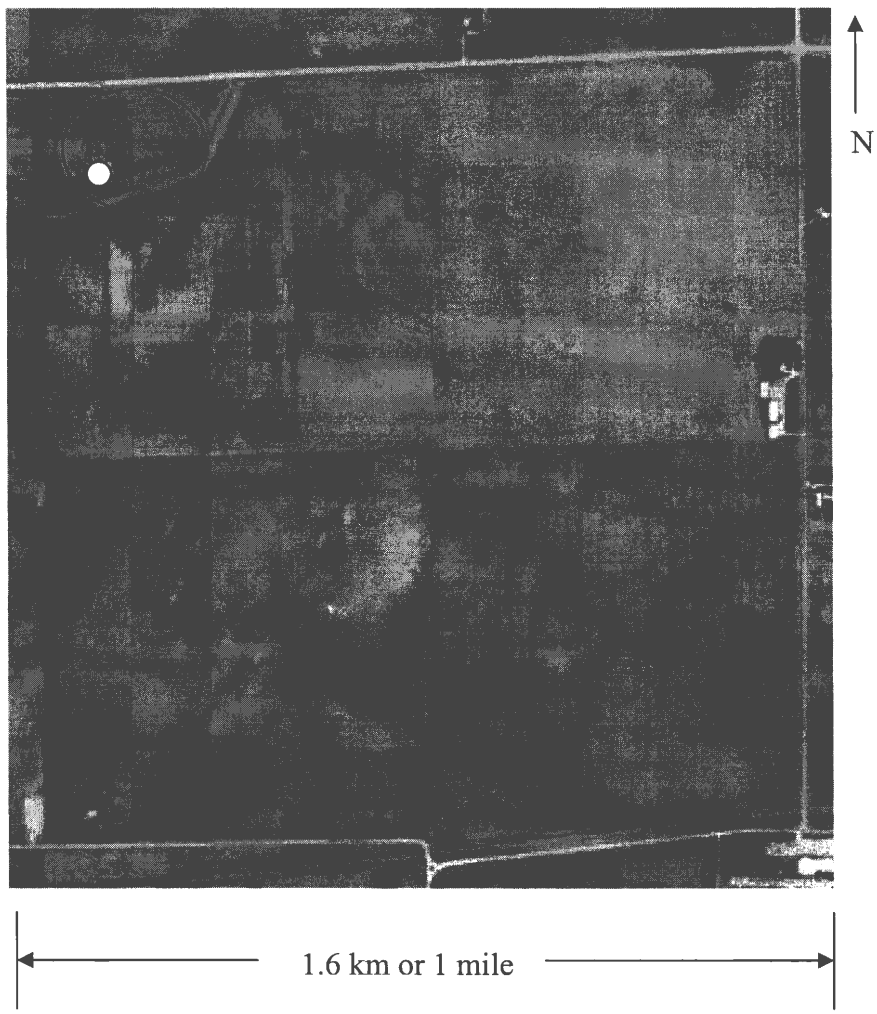


Figure 16. Aerial photographs of Hardin County pedon location. The circle indicates the area of Haplosaprist and the dot indicates the pedon location.

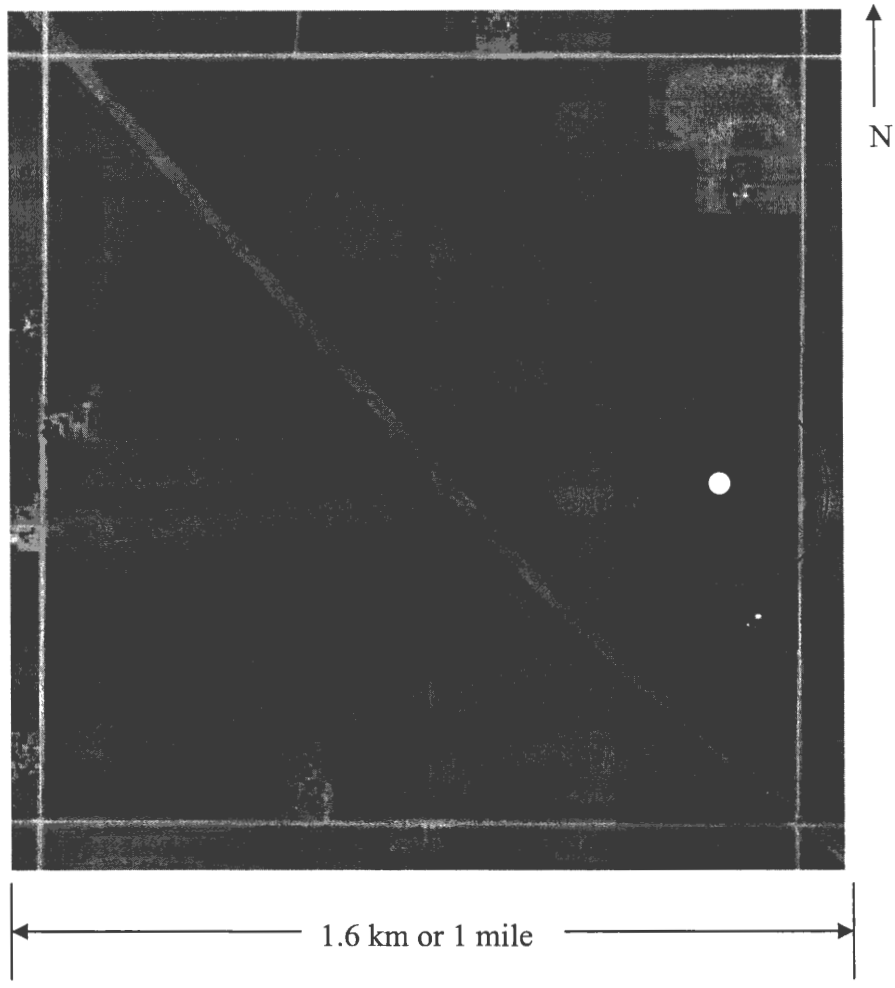


Figure 17. Aerial photographs of Humboldt County pedon location. The circle indicates the area of Haplosaprist and the dot indicates the pedon location.

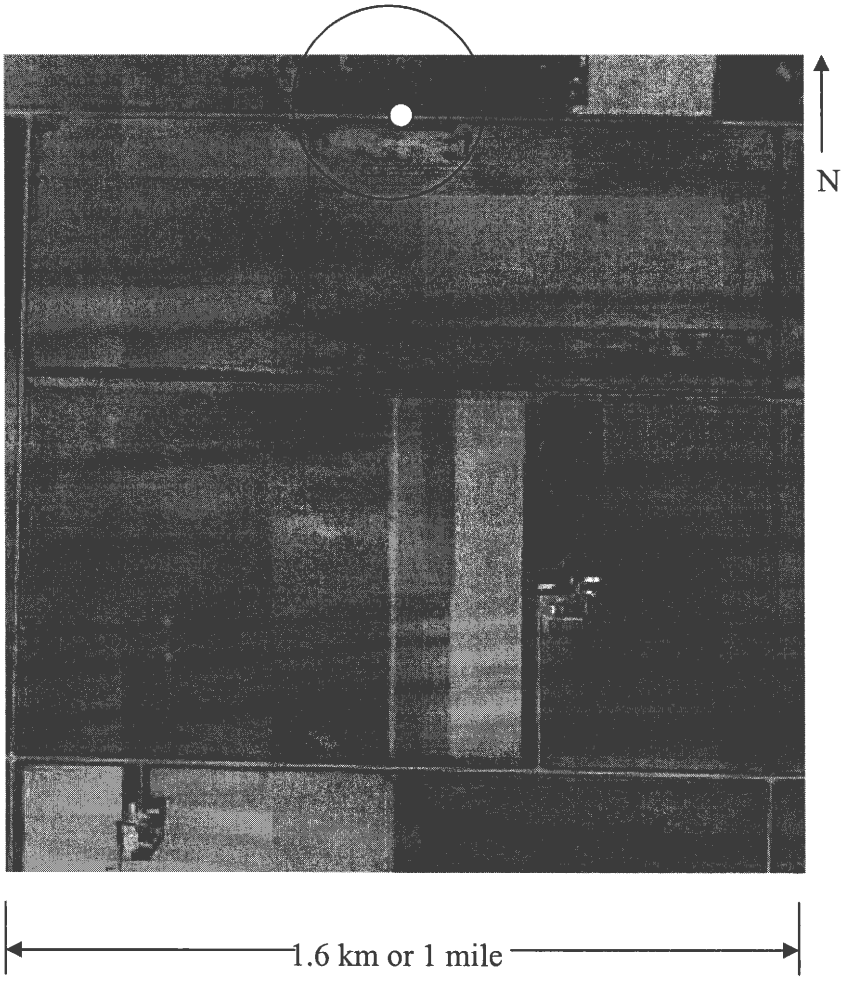


Figure 18. Aerial photographs of Kossuth County pedon location. The circle indicates the area of Haplosaprist and the dot indicates the pedon location.

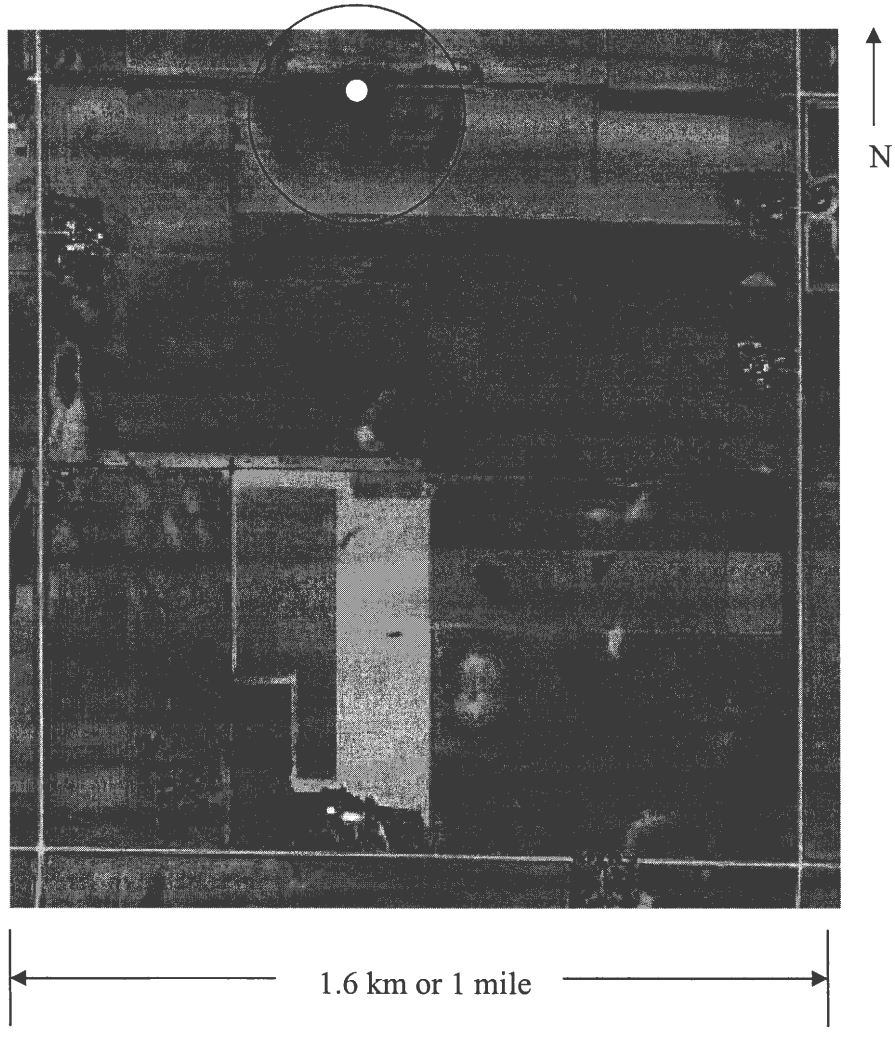


Figure 19. Aerial photographs of Palo Alto County pedon location. The circle indicates the area of Haplosaprist and the dot indicates the pedon location.

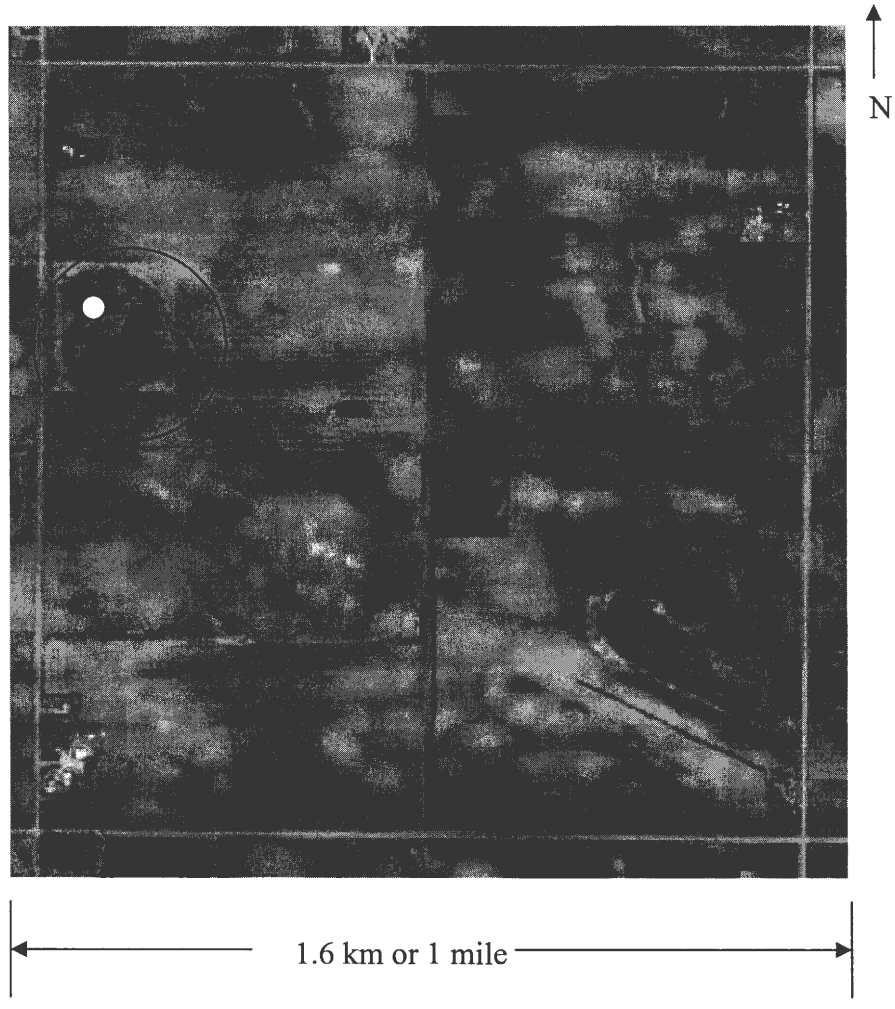


Figure 20. Aerial photographs of Polk County pedon location. The circle indicates the area of Haplosaprist and the dot indicates the pedon location.

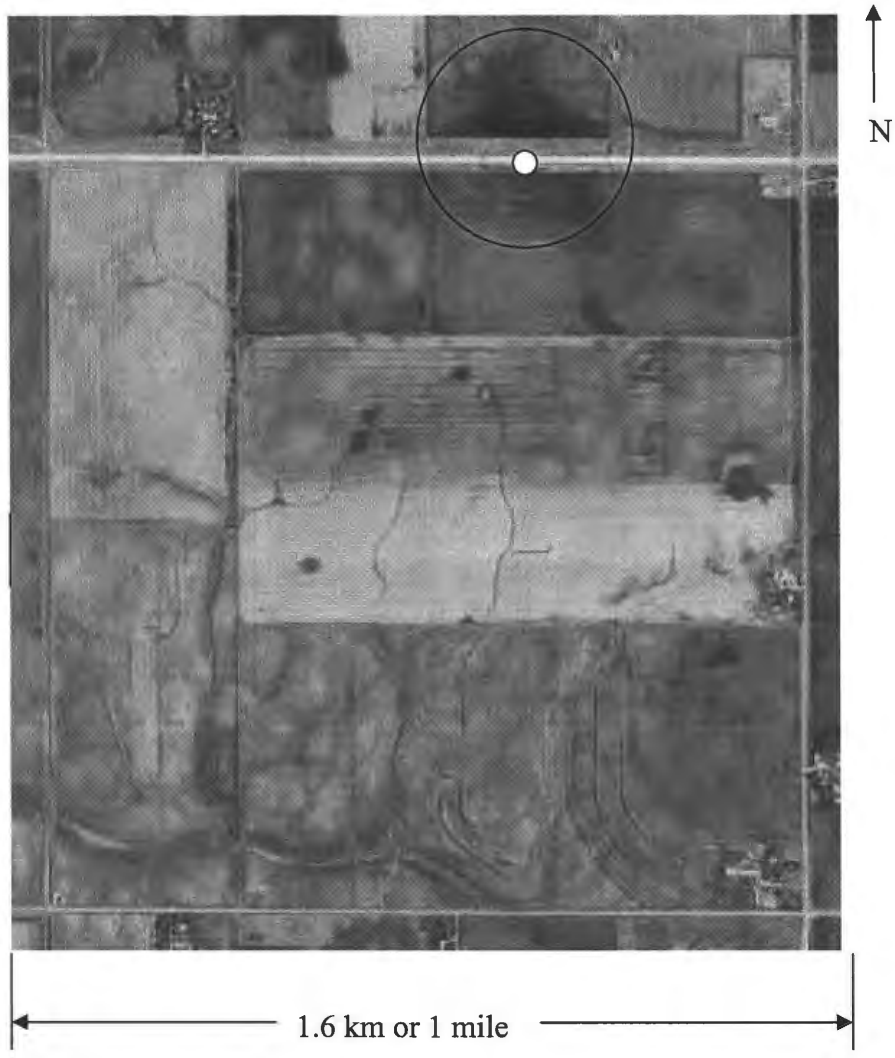


Figure 21. Aerial photographs of Story County pedon location. The circle indicates the area of Haplosaprist and the dot indicates the pedon location.

Figure 22. Aerial photographs of Winnebago County pedon location. The circle indicates the area of Haplosaprist and the dot indicates the pedon location.

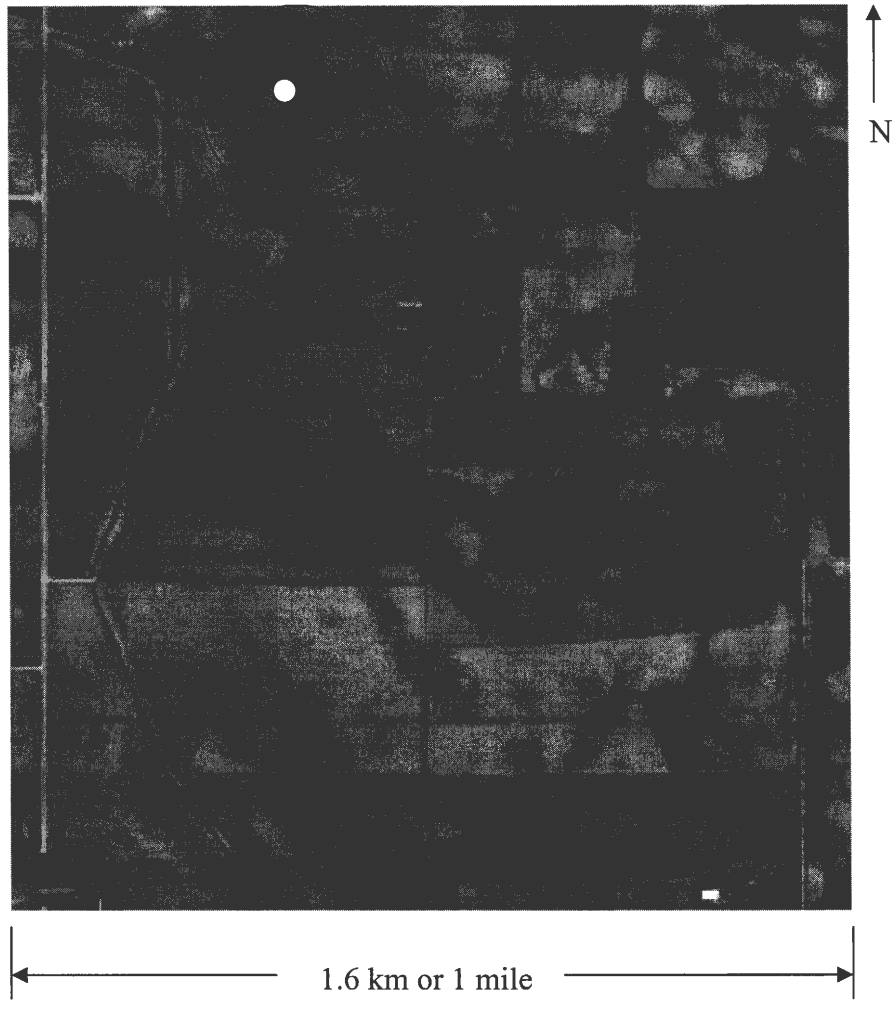


Figure 23. Aerial photographs of Worth County pedon location. The circle indicates the area of Haplosaprist and the dot indicates the pedon location.

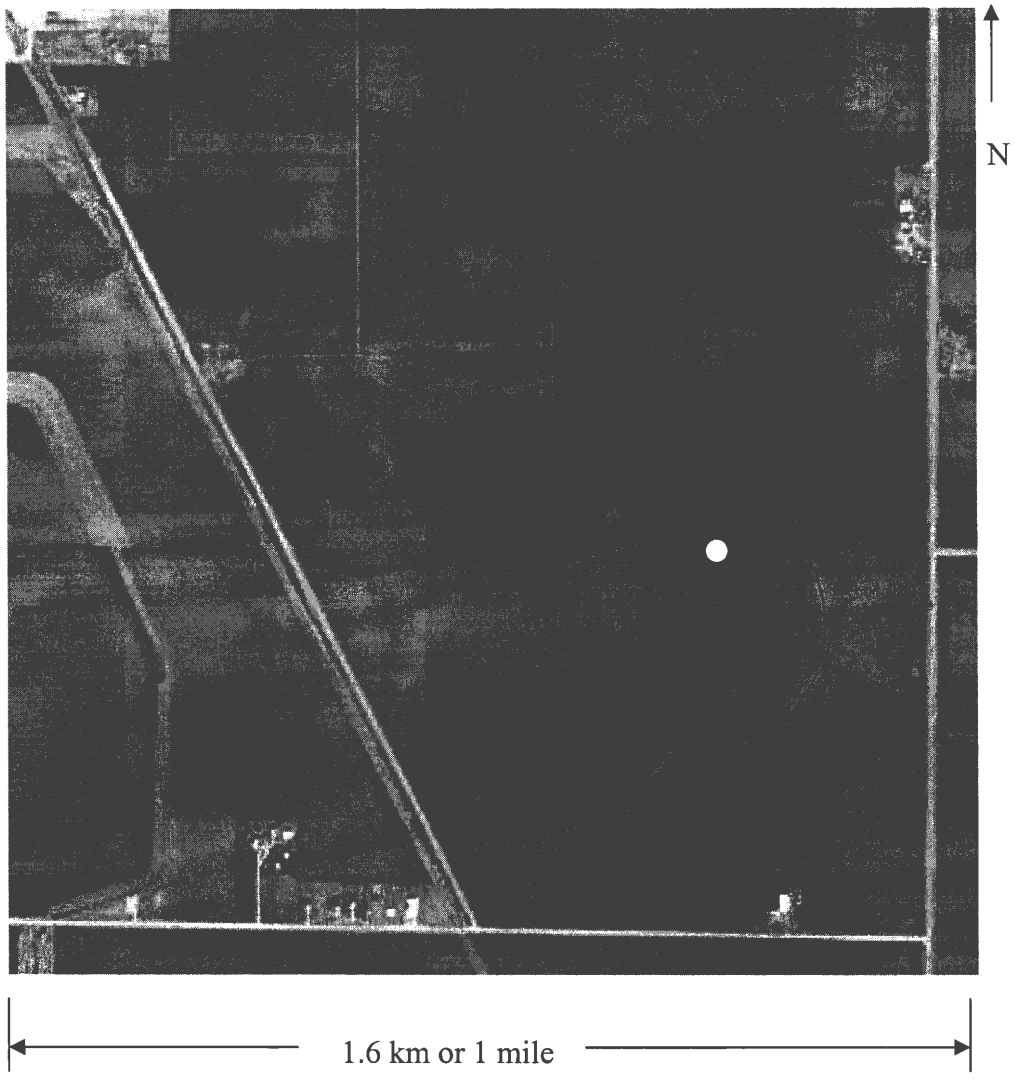


Figure 24. Aerial photographs of Wright County pedon location. The circle indicates the area of Haplosaprist and the dot indicates the pedon location.

Figure 25. Truck mounted hydraulic soil probe. Photographed by Beth Larabee.
(Photograph located at the Humboldt County study site.)

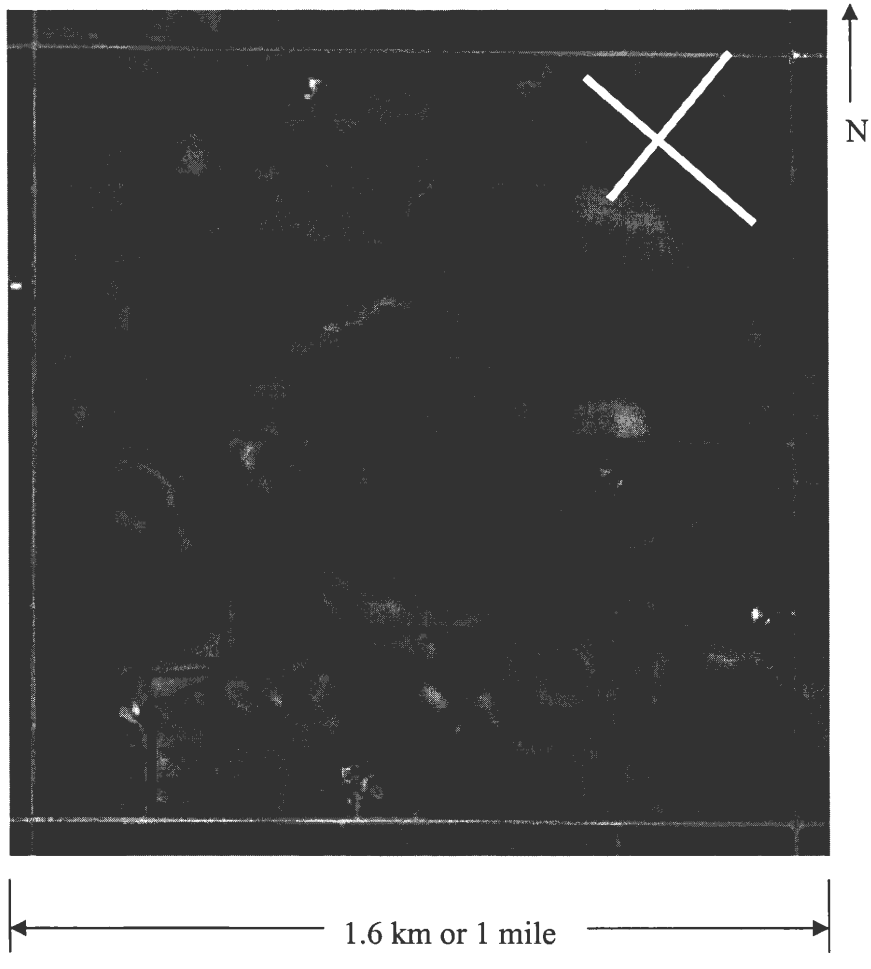


Figure 26. Aerial photographs of Cerro Gordo County transects location.

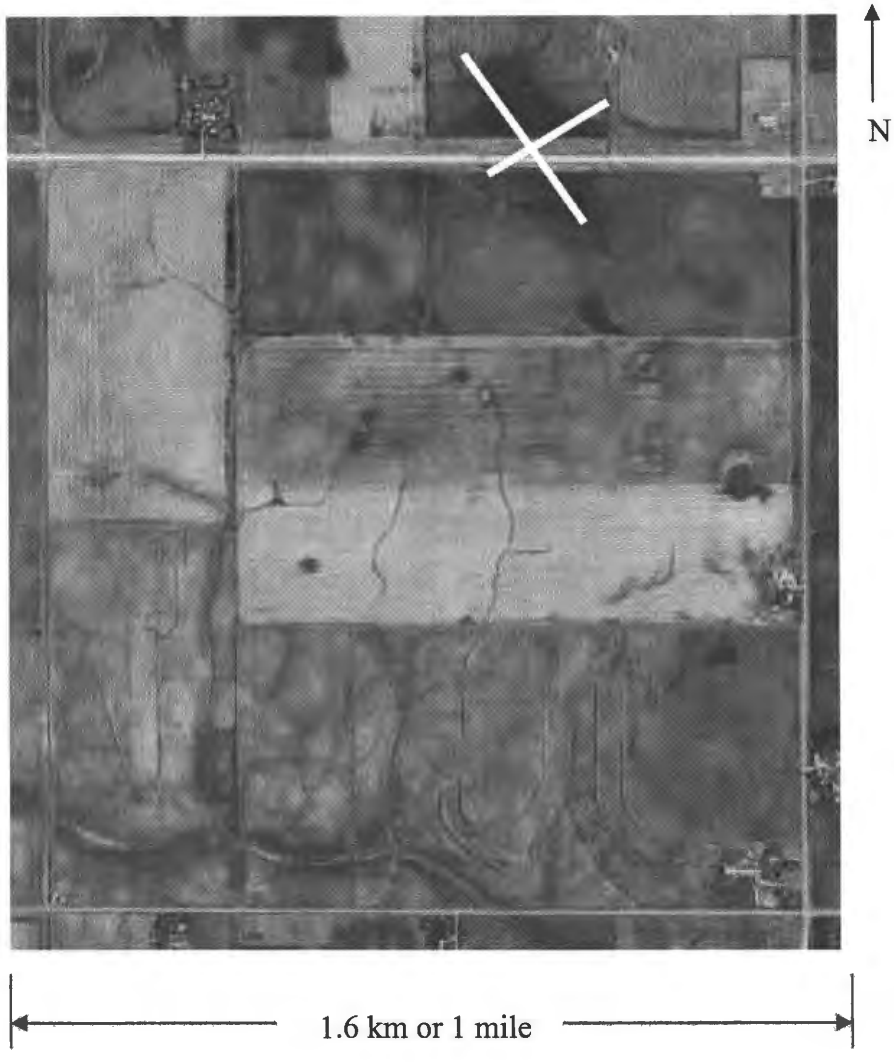


Figure 27. Aerial photographs of Story County transects location.

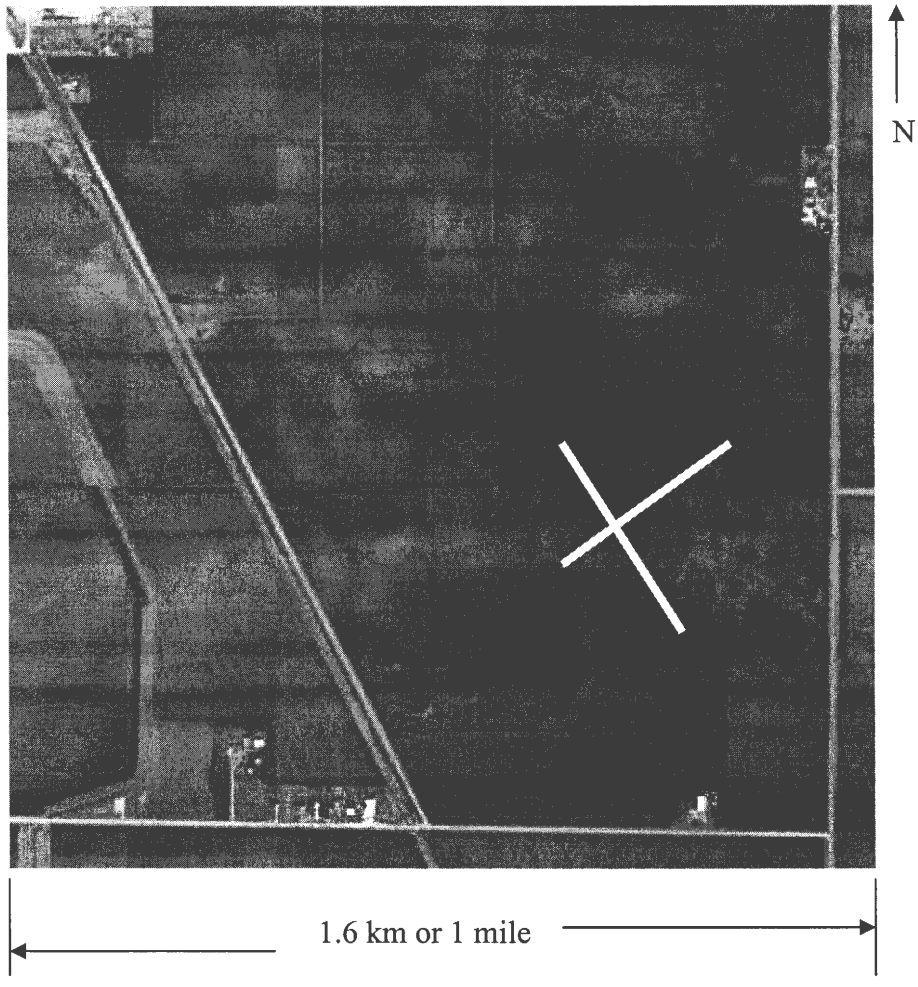


Figure 28. Aerial photographs of Wright County transects location.

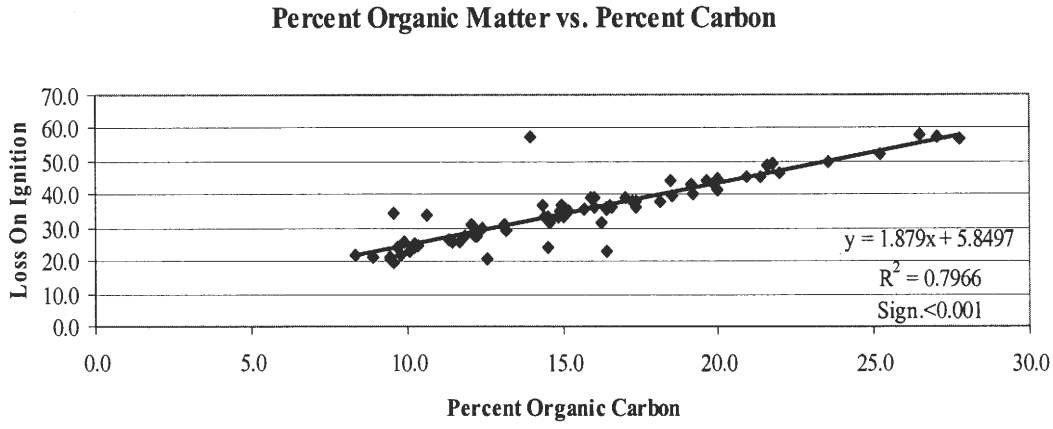


Figure 29. Loss on ignition versus percent organic carbon for all samples pH 7 or less.

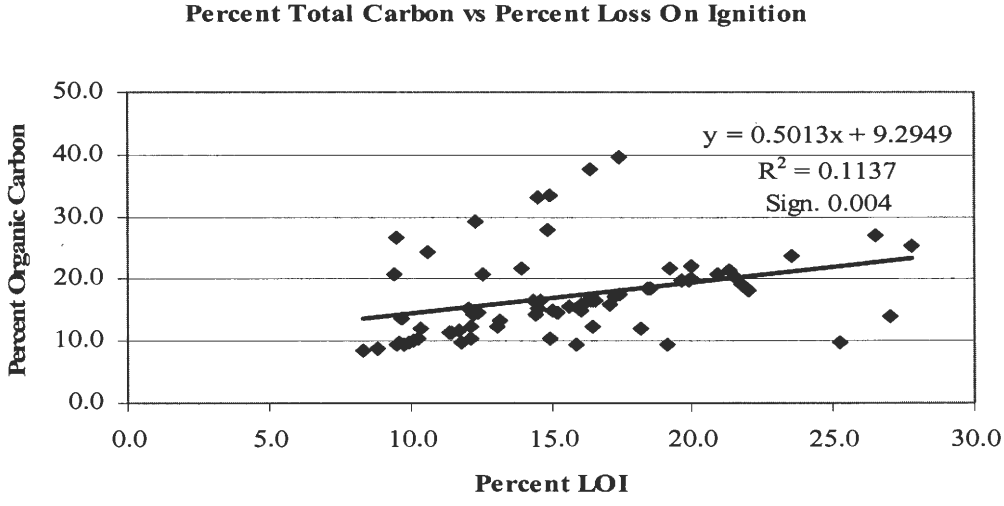


Figure 30. Percent carbon versus percent loss on ignition.

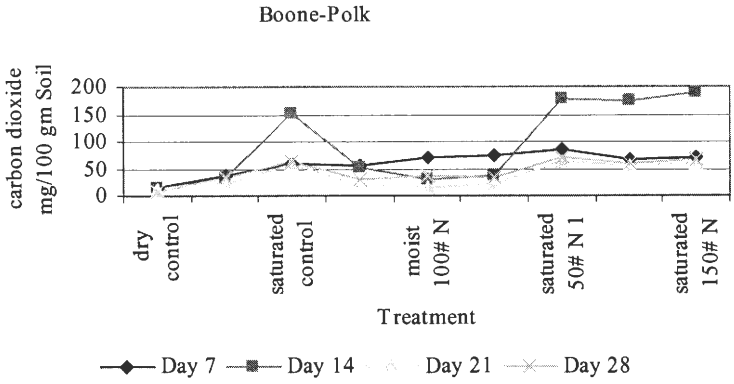


Figure 31. Boone-Polk composite sample carbon dioxide evolution using varying moisture and nitrogen additions.

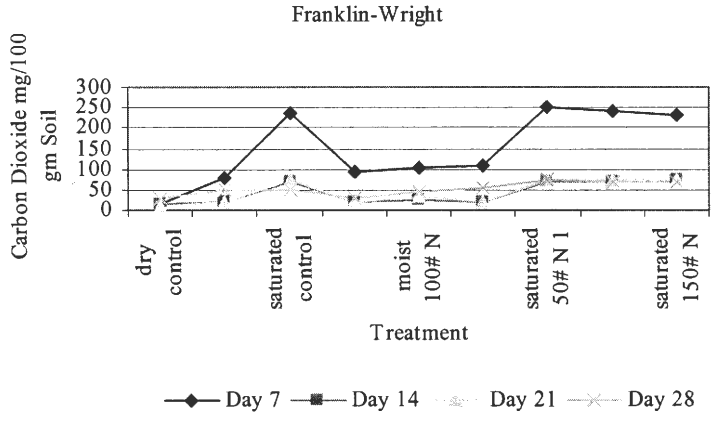


Figure 32. Franklin-Wright composite sample carbon dioxide evolution using varying moisture and nitrogen additions.

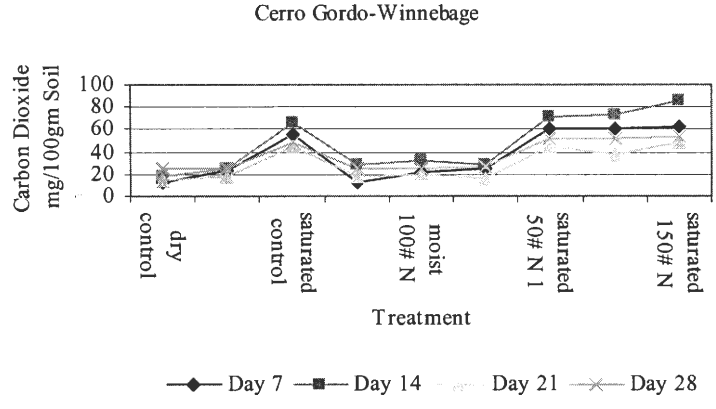


Figure 31. Cerro Gordo-Winnebago composite sample carbon dioxide evolution using varying moisture and nitrogen additions.

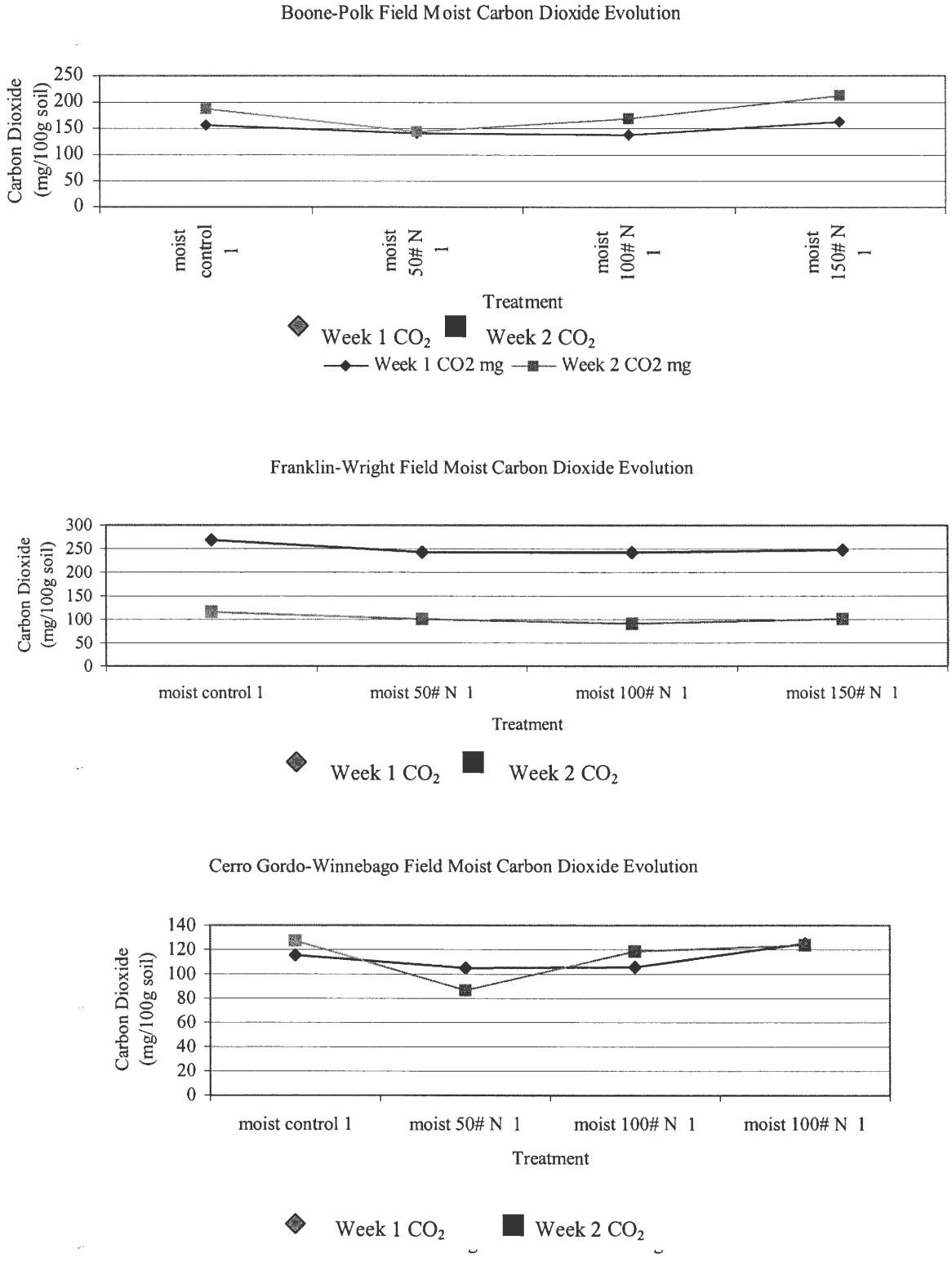


Figure 34. Field moist carbon dioxide evolution.

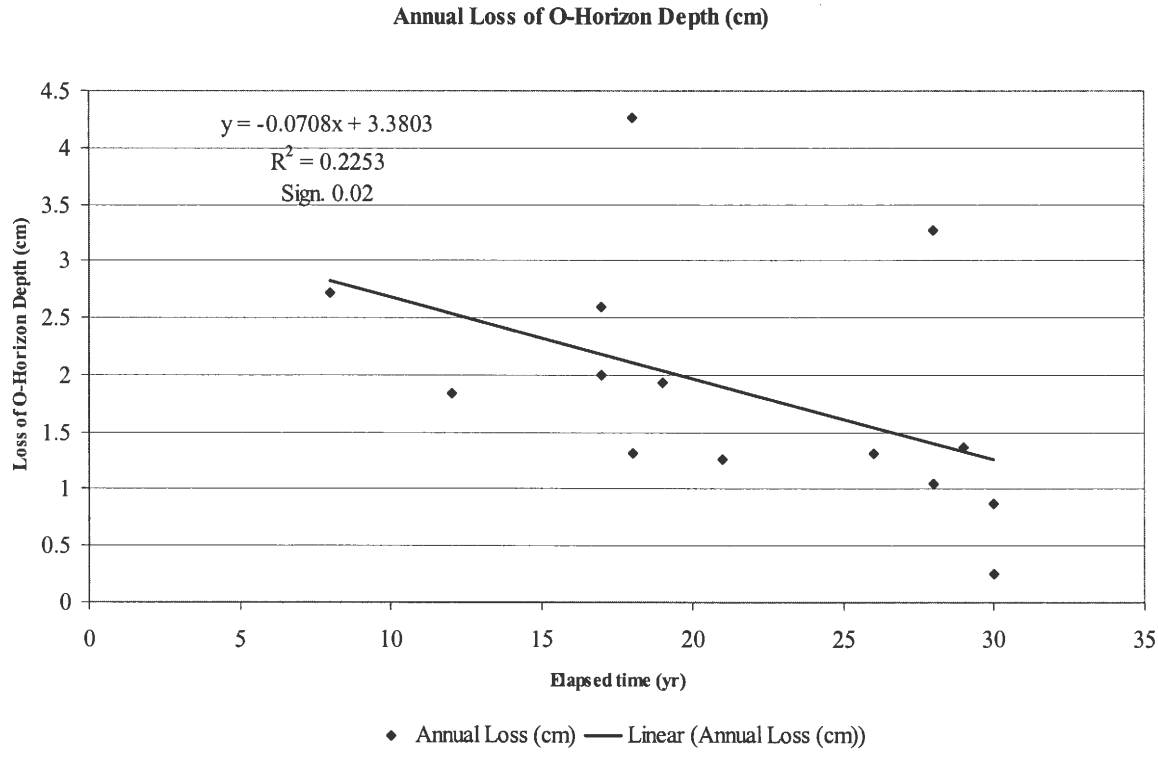


Figure 35. Annual loss of O-horizon depth.

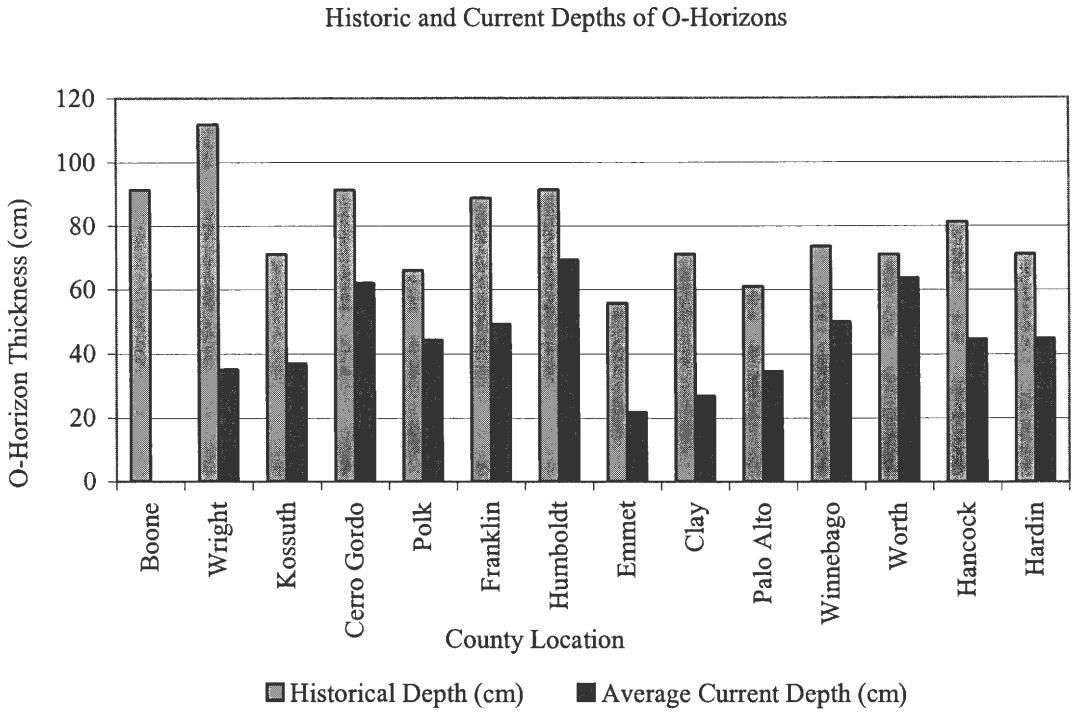


Figure 36. Historic depths of O-Horizon representative pedons and current depths of O-Horizon of central pedons.

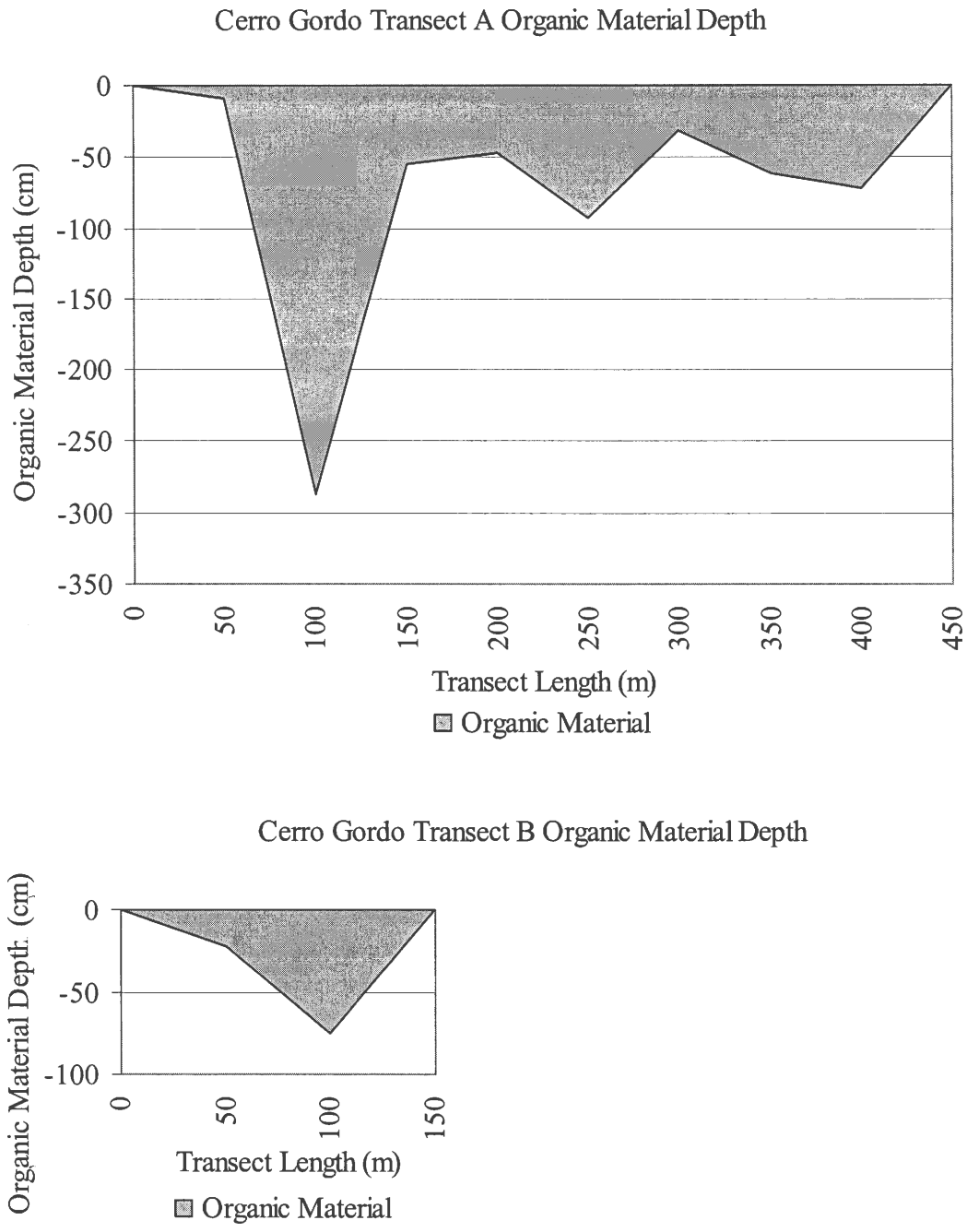
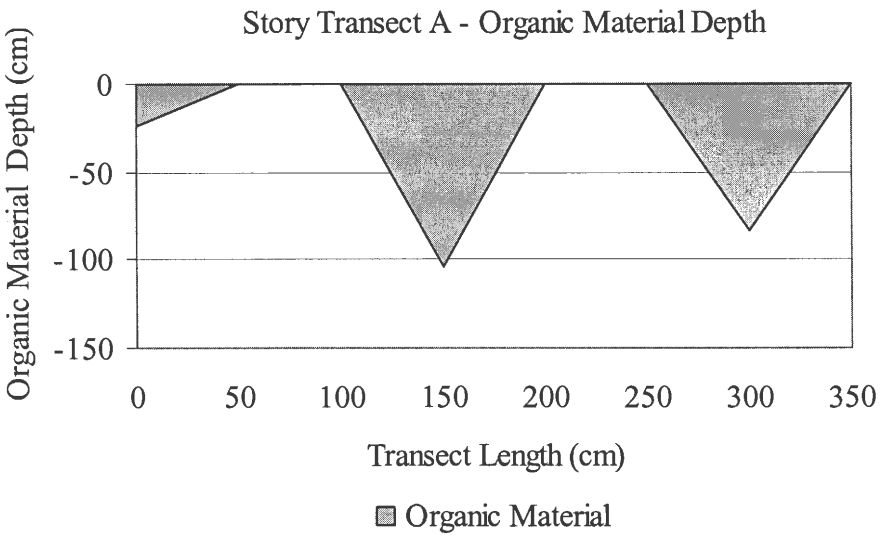


Figure 37. Cerro Gordo County transects organic material depths.



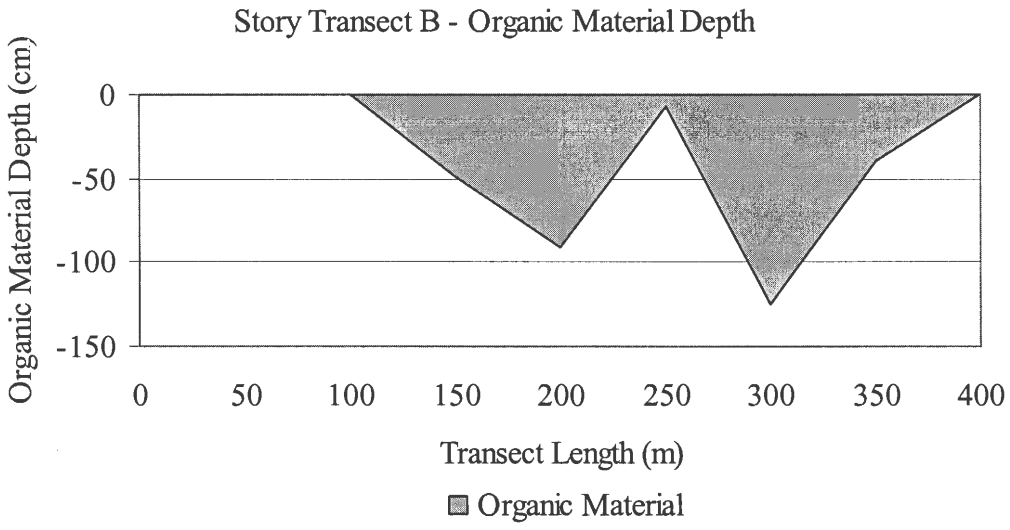


Figure 38. Story County transects organic material depths.

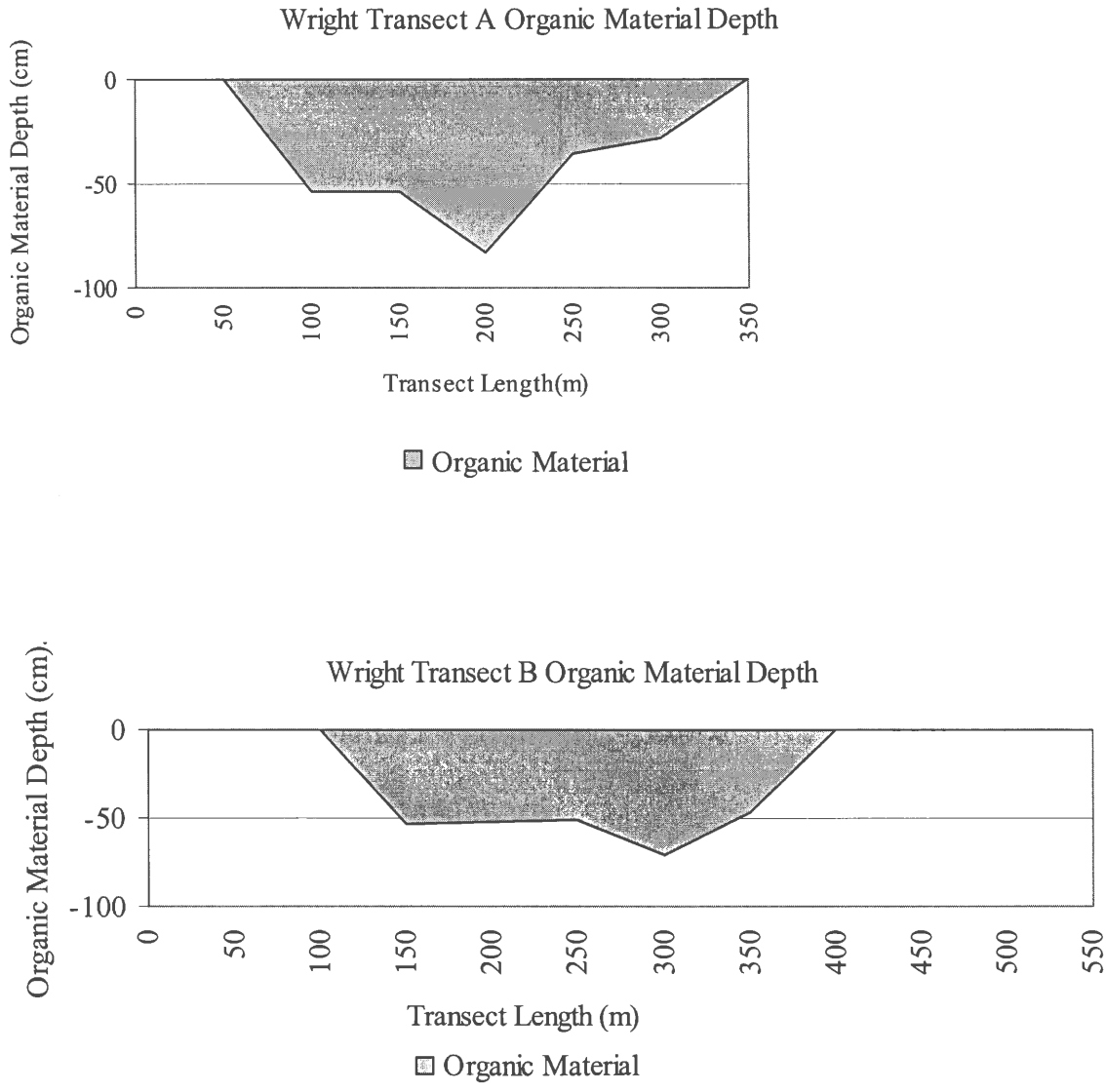


Figure 39. Wright County transect organic material depths.

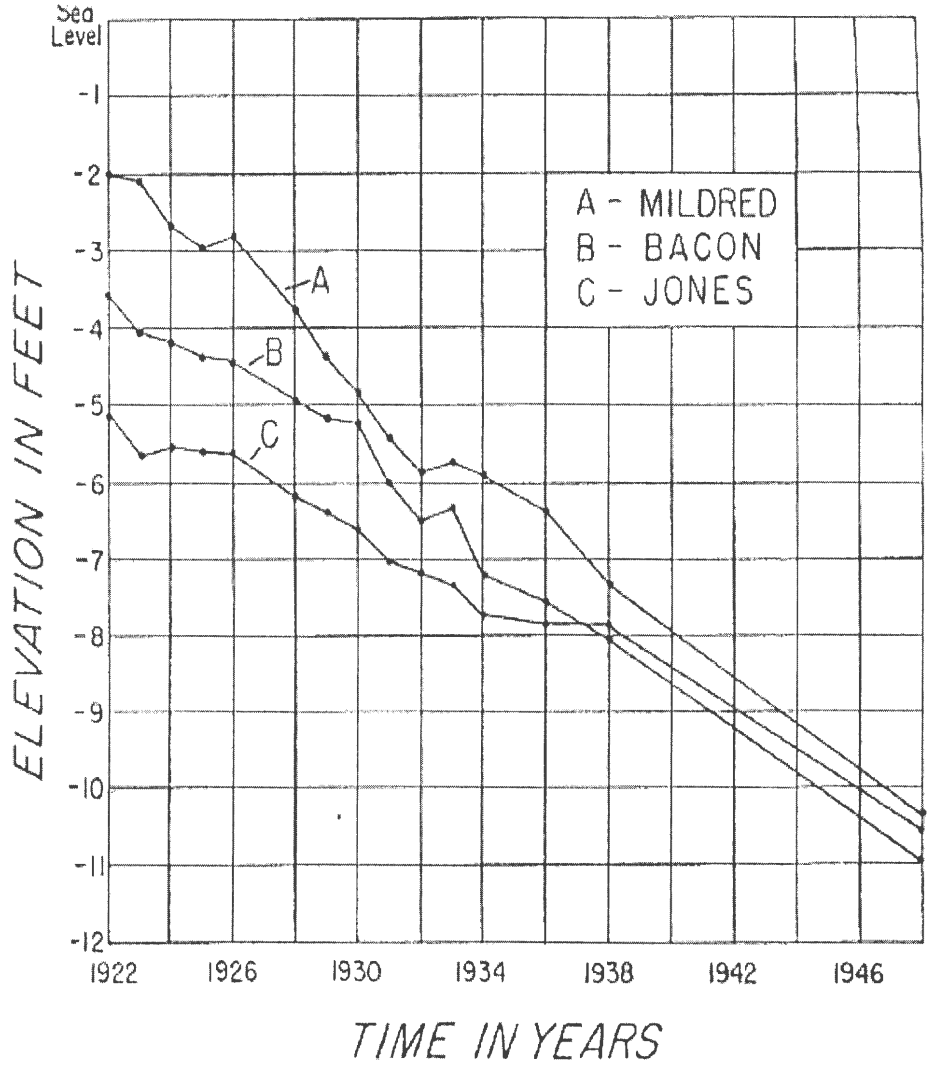


Figure 40. A progressive subsidence of Mildred, Bacon and Jones islands took place between 1922 to 1946, *(Source Modified from Weir, W.W., 1950. Subsidence Peat Land of the Sacramento-San Joaquin Delta, California.)*

TABLES

Table 1. Landform, land use and climate data for study sites.

	Temperature Averages (°C)					
Sites by County	Average Daily Maximum*	Average Daily Minimum*	Yearly Average *	Total Ave. Precipitation (cm)*	Landform *	Current Land Use**
Boone	15.3	2.9	9.1	82.6	moraine depression	pasture
Cerro Gordo	12.8	1.4	7.1	74.7	moraine depression	corn/bean rotation
Clay	14.3	1.6	7.9	69.0	upland depression	conservation reserve
Emmet	12.9	1.1	6.7	68.6	upland depression	corn/bean rotation
Franklin	13.6	2.0	7.8	84.2	upland depression	corn/bean rotation
Hancock	13.9	2.1	8.0	78.2	glacial lake bed	corn/bean rotation
Hardin	14.0	2.2	8.1	81.1	upland depression	corn/bean rotation
Humboldt	13.8	2.4	8.6	73.5	upland depression	corn/bean rotation
Kossuth	13.9	1.8	7.8	72.2	upland depression	corn/bean rotation
Palo Alto	13.9	2.2	8.1	67.0	upland depression	corn/bean rotation
Polk	15.2	3.6	9.4	79.0	upland depression	corn/bean rotation
Story	14.1	2.3	8.2	84.4	upland depression	corn/bean rotation
Winnebago	13.4	1.6	7.5	77.7	upland depression	corn/bean rotation
Worth	13.3	1.7	7.5	78.8	upland depression	corn/bean rotation
Wright	13.7	1.8	7.8	76.9	upland depression	corn/bean rotation

*compiled from USDA NRCS Soil Surveys for each county

**observation

Table 2. Background information of the Palms sites

Sites by County	Author & Year	Location in English units	Location in metric units
Boone	Andrews et. al.,	390 feet east and 2,300 feet north of the southwest corner of sec. 6,	118.8 meters east and 701.0 meters north of the southwest
Cerro Gordo	DeWitt et. al., 1981	733 feet west and 77 feet south of the northeast corner of sec. 15	223.4 meters west and 23.5 meters south of the northeast
Clay	Fisher, 1969	1,400 feet north and 2250 feet west of the southeast corner of	426.7 meters north and 605.8 meters west of the southeast
Emmet	Jones et. al., 1997	2,600 feet east and 340 feet north of the southwest corner of sec.	792.5 meters east and 103.6 meters north of the southwest
Franklin	Voy et. al., 1980	530 feet north and 130 feet west of the southeast corner of sec. 35,	106.7 meters north and 39.6 meters west of the southeast
Hancock	Lensch et. al., 1989	300 feet north and 2,370 feet west of the southeast corner of sec. 26,	91.4 meters north and 722.4 meters west of the southeast
Hamilton	Dideriksen et. al.,	2,500 feet east and 1,100 feet south of the southwest corner of	762.0 meters east and 335.3 meters south of the southwest
Hardin	Voy et. al., 1985	500 feet east and 170 feet south of the northwest corner of sec. 22	152.4 meters east and 51.8 meters south of the northwest
Humboldt	Richlen et. al., 1961	2,500 feet north and 300 feet west of the southeast corner of sec. 14,	762.0 meters north and 91.4 meters west of the southeast
Kossuth	Jones et. al., 1983	2,340 feet east and 50 feet south of the northwest corner of sec. 12,	713.2 meters east and 15.2 meters south of the northwest
Palo Alto	Jones et. al., 1977	300 feet west and 40 feet south of the northeast corner of the	91.4 meters west and 12.2 meters south of the northeast
Polk	Dideriksen & Radatz,	1,560 feet south and 275 feet east of the northwest corner of sec. 29,	475.5 meters south and 83.8 meters east of the northwest
Story	DeWitt et. al., 1984	1,950 feet west and 60 feet south of the northeast corner of sec. 14,	594.4 meters west and 15.2 meters south of the northeast
Winnebago	Abel et. al.,1987	2,480 feet west and 190 feet north of the southeast corner of sec. 12,	755.9 meters west and 57.9 meters north of the southeast
Worth	Buckner, et. al.,	1,450 feet south and 670 feet east of the northwest corner sec.36,	442.0 meters south and 204.2 meters east of the northwest
Wright	Dideriksen et. al.,	1,650 feet west and 150 feet south of the northeast corner of sec. 2,	502.9 meters west and 45.7 meters south of the northeast

Table 3 Carbon dioxide evolution experiment; composite samples and approximate latitudes.

Composite Sample	**Approximate Latitude**
Boone	42°10'
Polk	41°48'
Franklin	42°44'
Wright	42°35'
Cerro Gordo	43°13'
Winnebago	43°30'

Table 4. Summary of oral histories: common characteristics of nine Palms representative pedons on the Des Moines Lobe in Iowa.

Characteristics of Study Sites	Respondents Reporting
Hand dug trenches for initial tile installation. (most done in winter)	9
Locally manufactured tile.	7
Tile outlets problematic.	9
Tile failure within 5 years of initial installation	6
Frequent tile repairs.	7
Complete tile replacement.	4
Frequent crop loss due to ponding with functional tile.	4
Moderate wind erosion, loss of a few millimeters depth per strong wind event when tilled	2
Extensive wind erosion loss with several cm lost in a single strong wind event.when tilled.	1
Fire after cultivation (burn time 4 months).	1
High yields during dry years.	3
Difficult to manage (poor seed to soil contact, micronutrient deficiencies, lack	8
Other issues: irritation of eyes, nose throat, itching skin	9
Current corn and soybean rotation	7
Current pasture	1
Conservation Reserve Program	1
Frost problems due to cold air drainage to low lying areas.	3
Historical agricultural and commercial crops: corn, wheat, rye, oats, alfalfa, clover, vetch, soy forage, cool season grass pasture, warm season grass pasture, potatoes, sugar beets, turnips carrots, sweet potatoes, sugar beat, peas, beans, sweet corn, pumpkins, squash and dry beans.	Summary

Table 5. Frequency of central pedon descriptions of interest.

Location of Sites by County	Clay Coatings	Organans	Snail Shells	Odor	Crystals	Redox Depletions	Redox Consentrations	Plant Fragments**	Von Post Decomposition Scale	Hydrophobic	Carbonate Masses	Histic Epipedon	Histosol
Boone	X	X							N.A.		X		
Cerro Gordo							X		R_3 H10		X		X
Clay	X	X	X	mild			X		R_3 H10		X	X	
Emmet	X	X				X	X		R_3 H10		X	X	
Franklin	X	X	X			X	Pores only		R_3 H10		X		X
Hancock	X	X				X	Pores only	X	R_3 H_9				X
Hardin	X	X				X	X	X	R_3 H_9		X		X
Humboldt		X		mild					R_3 H10				X
Kossuth			X			X			R_3 H10			X	
Palo Alto		X	X			X	X		R_3 H10			X	
Polk	X	X	X			X	X		R_3 H10			X	
Story*									R_3 H10				
Winnebago	X			mild		X	X		R_3 H10				X
Worth			X	sulfer	X		Pores only	X	R_3 H_9	X			X
Wright	X	X				X	X		R_3 H10		X		X

*The Story county representative Palms series pedon location could not be sampled due to road building activities and multiple buried utilities.

**Plant fragments could be identified as plant fragments but disintegrated with touching or rubbing.

Table 6. Current taxonomic classification of pedons

Table 6. Current taxanomic classification of pedons.

Pedon Location by County	Classification	Pedon Location by County	Classification
Boone	Typic Calciaquoll	Winnebago	Terric Haplosaprists
Cerro Gordo	Terric Haplosaprists	Worth	Terric Haplosaprists
Clay	Histic Endoaquoll	Wright	Terric Haplosaprists
Emmet	Histic Endoaquoll	Cerro Gordo Transect	Terric Haplosaprists
Franklin	Terric Haplosaprists		Typic Calciaquoll
Hancock	Terric Haplosaprists		Typic Endoaquoll
Hardin	Terric Haplosaprists	Story Transect	Terric Haplosaprists
Humboldt	Terric Haplosaprists		Typic Calciaquoll
Kossuth	Typic Calciaquoll		Typic Endoaquoll
Palo Alto	Typic Calciaquoll	Wright Transect	Terric Haplosaprists
Polk	Typic Calciaquoll		Typic Calciaquoll,
Story	*		Typic Endoaquoll

* The Story County representative Palms Pedon could not be sampled due to road building activities and multiple buried utilities.

Table 7. Summary of pH, bulk density, total carbon for all horizons, total carbon for organic horizons, percent clay and loss on ignition.

	pH		Bulk Density (Mg*m-3)				Percent Total Carbon O-Horizons		Percent Total Carbon All horizons		Percent clay		LOI	
Site location by county	Range	Average	Range	Average	O Horizons	O & A Horizons	Range	Average	Range	Average	Range	Average	Range	Average
Boone	6.69-8.19	7.47	0.50-1.30	0.9	none	0.75	none	none	0.87-7.51	2.61	none	none	none	none
Cerro Gord	6.27-8.04	7.22	0.43-1.68	1.03	0.73	1.16	9.44-19.53	15.93	1.91-19.53	10.29	1.1-10.1	6.4	2.6-43.0	26.6
Clay	6.59-7.75	7.41	0.36-1.28	0.94	0.44	0.75	12.34-12.58	12.44	2.40-12.58	3.18	2.3-7.5	5.5	20.8-29.8	26.6
Emmet	6.26-8.19	7.72	0.39-1.37	1.13	0.42	0.68	14.51-15.2	14.76	1.93-15.20	4.63	2.1-2.3	2.2	31.6-34.8	33.3
Franklin	7.92	7.01	0.35-2.10	1.31	0.45	0.95	12.26-17.04	15.35	1.32-17.04	6.45	0.4-10.1	3.1	27.0-39.0	35.73
Hancock	5.33-7.63	6.77	0.24-1.43	0.94	0.33	0.66	9.56-27.80	21.67	0.75-27.80	8.88	1.2-7.4	5.2	19.4-70.6	53.4
Hardin	5.35-7.82	7.05	0.40-1.99	1.1	0.4	0.71	18.17-21.98	20.46	2.47-21.98	8.06	2.5-6.3	3.6	37.8-49.2	43.9
Humboldt	5.98-7.29	6.46	0.19-1.14	0.57	0.44	0.51	9.67-15.05	12.04	3.10-15.05	9.93	1.3-10.6	6.6	19.2-34.8	28
Kossuth	5.74-7.77	7.02	0.43-1.24	0.92	0.51	0.51	8.87-16.70	13.27	1.89-16.70	6.50	3.5-9.8	6.3	21.2-36.6	29.7
Palo Alto	5.96-7.80	7.27	0.43-1.55	0.98	0.46	0.62	10.65-17.38	14.79	2.36-17.38	5.97	2.5-11.1	5	24.2-39.6	33.5
Polk	6.13-7.84	7.26	0.42-1.58	1.05	0.71	0.6	9.49-11.53	10.2	2.08-11.53	4.63	3.7-7.7	5.3	19.3-34.2	23.5
Story	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Winnebago	6.00-7.85	6.8	0.32-1.90	0.89	0.4	0.62	16.52-23.57	22.36	1.21-21.36	10.59	2.4-4.5	3.4	37.4-49.8	43.8
Worth	1.87-6.62	4.81	0.34-1.03	0.65	0.44	0.61	11.15-23.31	17.14	2.24-23.53	11.71	2.4-32.8	8.9	15.8-47.8	37.45
Wright	3.96-7.89	6.06	0.50-1.30	0.9	0.73	0.75	10.09-16.44	13.66	1.35-7.26	7.26	4.6-12.2	7.5	23.0-36.2	30.23
Cerro Gordo	6.69-8.19	7.47	0.50-1.30	0.9	none	0.75	8.12-24.93	15.69	0.87-24.93	7.66	0.2-17.1	5	2.6-52.0	29.3
Story Transects	6.27-8.04	7.22	0.43-1.68	1.03	0.73	1.16	8.49-29.43	15.79	.062-29.43	7.00	0.2-9.9	5	10.0-62.0	32.3
Wright Transects	6.59-7.75	7.41	0.36-1.28	0.94	0.44	0.75	8.19-29.50	14.29	.42-29.50	5.28	2.8-15.1	7.5	11.2-63.8	32

* The Story county representative Palms series pedon location could not be sampled due to road building activities and multiple buried utilities.

Table 8 Average change in O-Horizon Thickness in centimeters and percentages.

Representative and central pedon locations by county	Average Representative Pedon Depth (cm)	Average Central Pedon Depth (cm)	Change in Depth (cm)	Elapsed Time (yr)	Average Annual Loss (cm)	Average Percent Change in Depth	Percent Depth Loss per year
Boone	91.4	0.0	91.44	28	3.27	100	3.57
Cerro Gordo	91.4	62.0	29.4	28	1.05	32	1.15
Clay	71.1	27.0	44.12	17	2.60	62	3.65
Emmet	55.8	21.8	33.97	17	2.00	61	3.58
Franklin	88.9	49.3	39.57	29	1.36	45	1.53
Hancock	81.3	44.7	36.61	19	1.93	45	2.37
Hardin	71.2	44.8	26.38	21	1.26	37	1.76
Humboldt	91.4	69.3	22.07	12	1.84	24	2.01
Kossuth	71.1	37.0	34.12	26	1.31	48	1.85
Palo Alto	61.0	34.7	26.29	30	0.88	43	1.44
Polk	66.0	44.3	21.71	8	2.71	33	4.11
Story	*	*	*	*	*	*	*
Winnebago	73.7	50.0	23.66	18	1.31	32	1.78
Worth	71.1	63.7	7.45	30	0.25	10	0.35
Wright	111.8	35.2	76.63	18	4.26	69	3.81
Average	78.4	49.6	36.67	21.5	1.86	47	1.98

*The Story county representative Palms series pedon location could not be sampled due to road building activities and multiple buried utilities

Table 9 Rates of subsidence in relation to depths of water table. *(From Mirza and Irwin (1963) in Wilding, Smeck and Hall (1983))*

Location	Depth to water table		Rate of subsidence		Time required for primary subsidence (yrs)
	in.	cm.	in. yr^{-1}	cm. yr^{-1}	
Indiana	17	41	0.45	1.1	27
	27	69	0.7	1.8	17
	39	99	1.2	3.1	10
Minnesota	12	31	1.2	3.1	10
	54	137	4.8	12.2	2.5
Florida Everglades	14-18	36-46	0.75-1.00	1.9-2.5	
	18-24	46-61	1.00-1.50	2.5-3.8	10
	24-30	61-76	1.50-1.87	3.8-4.8	8

Indiana: Average crop year drainage depth, 7-yr period

Minnesota: Average crop year drainage depth, 5-yr period

Florida Everglades: Average annual drainage depth.

REFERENCES

Abel, P.L., R.J. Kuehl, R.G. Jones, R.A. Lensch, D. Selky, R. Vobora, R.W. Wilson and A. Younk. 1987. Soil Survey of Winnebago County, Iowa. USDA-SCS. U.S. Government Printing Office, Washington, D.C.

Amundson, R. and H. Jenny, 1991. The place of humans in the state factor theory of ecosystems and their soils. Soil Sci. Vol. 151 No.1

Anderson, D.W. 1995. Decomposition of organic matter and carbon emissions from soils. p.165-175 In R. Lal, J. Kimble E. Levine and B.A. Steward, (eds.)Soil and Global change. Advances in Science, CRC Press, Boca Raton FL.

Anderson, W.I. 1998. Iowa's Geological Past Three Billion Years of Earth History. University of Iowa Press, Iowa City, IA.

Andrews W.F., R.O. Dideriksen, E.D. Lockridge, and R.A. Greenough. 1981. Soil Survey of Boone County, Iowa USDA-SCS. U.S. Government Printing Office, Washington, D.C.

Arnold, R.W. 1983. Chapter 1. Concepts of soils and pedology. In L.P. Wilding, N.E. Smeck & G.F. Hall (ed.) Pedogenesis and Soil Taxonomy I. The Soil Orders. Elsevier Science Publishers B.V. Amsterdam.

Beauchamp, K.H. (ed.). 1987. A history of drainage and drainage methods, in Pavelis, G.A. Farm drainage in the United States--History, status, and prospects: Economic Research Service, USDA, Washington, D.C.

Brady N.C. and R.R. Weil. 2002. The Nature and Properties of Soils. 13th ed. Pearson Education Inc. Upper Saddle River, NJ.

Brejda, J.J., T.B. Moorman, D.L. Karlan, and T.H. Dau. 2000. Identification of Regional Soil Quality Factors and Indicators 1. Central and Southern High Plains. SSSA Journal, Madison, WI. 64: 2115-2124

Brejda, J.J., D.L. Karlan, J.L. Smith, and D.A. Allan . 2000. Identification of Regional Soil Quality Factors and Indicators II. Northern Mississippi Loess Hills and Palouse Prairie. SSSA Journal, Madison, WI. 64: 2125-2135

Buckner, R.L., T.A. Dewitt, W.L. Fouts, H.A. Harman, L.K. Johnson, N.L. Johnson. 1976. Soil Survey of Worth County, Iowa. USDA-SCS, U.S. Government Printing Office, Washington, D.C.

Burras C.L. and W.H. Scholtes. 1987. Basin properties and post glacial erosion rates of minor moraines in Iowa. Soil Sci. Soc. Am. J. 51: 1541-1547.

Burras, C.L. 2004. Selected information about "Bog Soils" in Iowa. Personal communication. Associate Professor, Iowa State University, Ames, IA.

Catt, J.A. 1986. Soils and Quaternary geology. p. 149-165. Oxford University Press, New York, NY.

Cochran, W.G. 1983. Planning and Analysis of Observational Studies. John Wiley and Sons, New York, NY.

Dahl, T.E. and G.J. Allord. 1999. Technical Aspects of Wetlands History of Wetland in the Conterminous United States in National Water Summary on Wetland. United States Geological Survey Water Supply Paper 2425. Available on line at http://water.usgs.gov/nwsum/WSP2425/history.html accessed 04-05-04.

DeWitt, T.A., R.L Buckner, D.L. Reeves and C.W. Wilson Jr. 1981. Soil Survey of Cerro Gordo County, Iowa. USDA-SCS, U.S. Government Printing Office, Washington, D.C.

DeWitt, T.A., R.C. Russell, J.C. Sanner B.F. Chalstrom and M.J. Weimenn. 1984. Soil Survey of Story County, Iowa. USDA-SCS, U.S. Government Printing Office, Washington, D.C.

Dideriksen, R.O., E.H. Harvey, R.A. Lensch, D.G. Selky, K.D. Voy, P.L. Abel, and B.F. Charlstrom. 1992. Soil Survey of Wright County, Iowa. USDA-SCS, U.S. Government Printing Office, Washington, D.C.

Dideriksen, R.O., E.H. Harvey, B.R. Chalstrom, M.P. Koppen and P.V. Sadler. 1986. Soil Survey of Hamilton County, Iowa. USDA-SCS, U.S. Government Printing Office, Washington, D.C.

Dideriksen, R.O. and C.A. Radatz. 2000. Soil Survey of Polk County, Iowa. USDA-NRCS, U.S. Government Printing Office, Washington, D.C

Doran J.W. and A.J. Jones, 1996. Methods for Assessing Soil Quality. SSSA Inc. Madison, WI.

Doran, J.W. and T.B.Parkin. 1994. Defining and Assessing Soil Quality. Defining Soil Quality for a sustainable environment. SSSA Special Publication 29. SSSA. Madison, WI.

EPA 2002. Global Warming (http://yosemite.epa.gov/oar/globalwarming.nsf/content/index.html, accessed 03/131/04)

EPA 1990. Wetland Loss Due to Agricultural Conversion: A Survey of Recent Data. USEPA, Office of Policy Planning and Evaluation, Washington, DC.

Everett, K.R. 1983. Chapter 1. Histosols. In L.P. Wilding, N.E. Smeck & G.F. Hall (ed.) Pedogenesis and Soil Taxonomy II. The Soil Orders. Elsevier Science Publishers B.V. Amsterdam.

Fenton, T.E. 2003. Personal communication. Professor, Iowa State University, Ames, IA.

Fischer, C.S. 1969. Soil Survey of Clay County, Iowa. USDA-SCS, U.S. Government Printing Office, Washington, D.C.

Hayes W.A. and M.J. Wepraskas, 2000. Morphological Changes in Soils Produced When Hydrology Is Altered by Ditching. Soil Sci. Soc. Am. J. 64:1893-1904.

Herrick, J.E. and P.H. Williams, 1992. Soil Quality: an indicator of sustainable land management? Applied Soil Ecology 15:75-83

Hill, B. 2004. Personnal Communication. Iowa State University Soil Testing Laboratory.

Iowa Commission to the Louisiana Purchase Exposition, 1904. The state of Iowa: something of it's history, its institutions, its resources and natural advantages. Iowa Publishing Company, Davenport, IA.

James, H.R. and T.E. Fenton. 1993. Water Table in Paired Artificially Drained and Undrained Soil Catenas in Iowa.

Jones, E.R. 1908. Notes on Drainage: Class room, Field and Laboratory Exercises for Students of Land Drainage. 1st ed. E.R. Jones, Madison, WI.

Jones, R.G., C.S. Fisher, L.M. Greiner, H.A. Harman, K.C. Hinkley and R.L. Jensen. 1977. Soil Survey of Palo Alto County, Iowa. USDA-SCS, U.S. Government Printing Office, Washington, D.C.

Jones, R.G., J. Hempel, G. Hilmer and M. Dugan. 1997. Soil Survey of Emmet County, Iowa. USDA-NRCS, U.S. Government Printing Office, Washington, D.C.

Jones, R.G., R.L. Jensen, W.D. Bragg, M.J. Wiemann, B. Clarks Jr., R.A. Lensch, R.W. Wilson and D.T. Muhs. 1983. Soil Survey of Kossuth County, Iowa. USDA-SCS. U.S. Government Printing Office, Washington, D.C.

Karmam, A. 1993. Chemical properties of organic soils. p. 458-472. In M.R. Carter (ed.) Soil Sampling and Methods of Analysis. Lewis Publishers, Boca Ratan, FL.

Kendall, R.G. 1950. Land Drainage. Faber and Faber Limited, London.

Klippart, J.H., 1867. The Principles and Practice of Land Drainage. Robert Clarke & Co. Cincinnati, OH.

Konen, M.E., 1999. Human impacts on Soils and Geomorphic Processes on the Des Moines Lobe, IA. Ph. D. diss. Iowa State Univ., Ames, IA.

Lensch, R.A., P.L. Abel, R.G. Jones, D.G. Selky, R.J. Vobra, R.W. Wilson and A.W. Younk. 1989. Soil Survey of Hancock County, Iowa USDA-SCS U.S. Government Printing Office, Washington, D.C.

Loynachan, T.E. 2003. Agronomy 485 Laboratory Manual. p. 43-47. Iowa State University Book Store, Ames, IA.

Lal, R. 1998. Soil Quality and Sustainability. p.170-30. In R. Lal, et.al. (ed.) Methods of Assessment of Soil Degradation. CRC Press, Boca Ratan, FL.

Lal. R, et. al. (eds.) 2004. Soil Degradation in the United States Extent, Severity, and Trends. Lewis Publishers, Boca Ratan, FL.

Luthin, J.E. (ed.) 1957. Drainage of Agricultural Lands. ASA.

Magdoff, F. 1992. Building soils for better crops. University of Nebraska Press, Lincoln, NE.

Martin R.C., 2002. Soil Quality for Sustainable Land Management: Organic Matter and Aggregation Interactions that Maintain Soil Functions. Agronomy Journal, 94:38-47

McKeague, J.A., F. DeConninck and D.P. Franzmeier. Chapter 6. Spodosols. In L.P. Wilding, N.E. Smeck & G.F. Hall (ed.) Pedogenesis and Soil Taxonomy II. The Soil Orders. Elsevier Science Publishers B.V. Amsterdam.

Miles, M. 1899. Progress of Discovery and Invention. p. 96-129. In Land Draining A Handbook for Farmers on the Practice of Farm Draining. Orange Judd Co., New York, NY.

Mitsch, W.J., and J.G. Gosselink, 2000. Wetlands 3rd. Ed. John Wiley & Sons Inc. New York, NY.

Morgan R.P.C. 1985. Soil Degradation and erosion as a result of agricultural practice In ,K.S. Richards et. al. (eds.) Geomorphology and Soils. George Allen and Unwin, London, UK.

Morris,.D.R., R..A.Gilbert, D.C. Reicoski and R.W. Gesch, 2004. Oxidation Potentials of Soil Organic Matter in Histosols Under Different Tillage Methods. SSSA Journal, Madison, WI. 51: 1541-1547

Norton, L.D. 1986. Erosion-sedimentation in a closed drainage basin in northwest Indiana. Soil Sci. Soc. Am. J. 50:209-213.

Organic Matter Management BU –7402 2002. 2004. In Soil Management Series BU-07398-GO University of Minnesota Extension. Available with updates on line at (http://www.extension.umn.edu/distribution/cropsystems/components/7402_02.html, accessed 04/14/04)

Parent, L.E. and Caron J. 1993. Physical properties of organic soils. p. 441-458. In R. Lal, et.al. (ed.) Methods of Assessment of Soil Degradation. CRC Press, Boca Ratan, FL.

Pavelis, G.A. (ed.) 1987. Farm drainage in the United States--History, status, and prospects: Economic Research Service, USDA, Miscellaneous Pub. No. 1455, 170 p.

Prior, J. C. 1991. Landforms of Iowa. University of Iowa Press, Ames, IA.

Reedy, K.R, and H.F. Hodges (eds.) 2002. Climate change and global crop productivity. CABI Publishing [electronic resource] New York NY.

Richlen, E.M., S.M. Smith and D.F. Slusher. 1961. Soil Survey of Humboldt County, Iowa. USDA-SCS. U.S. Government Printing Office, Washington, D.C.

Rosenbaum, P.R. 2002. Observational Studies 2nd Ed. Springer Verlag New York Inc. New York, NY.

Ruhe, R.V. 1969. Quaternary Landscapes in Iowa. Iowa State University Press, Ames, IA.

Rust, R.H. 1983. Chapter 1. Alfisols. In L.P. Wilding, N.E. Smeck & G.F. Hall (ed.) Pedogenesis and Soil Taxonomy II. The Soil Orders. Elsevier Science Publishers B.V. Amsterdam.

Schrader, T.A. 1955. Waterfowl and the potholes of the north central states. p. 596-604. In The yearbook of agriculture 1955: Washington, D.C., USDA, 84th Congress, 1st Session, House Document no. 32,

Schoeneberger, P.J., D.A.Wysocki, E.C. Benham and W.D. Broderson. 1998. Field book for Describing and Sampling Soils. Version 1.1 USDA-NRCS National Soils Survey Center, Lincoln, NE.

Simonson, R.W., F.F. Riecken and G.D. Smith. 1952. Understanding Iowa soils: an introduction to the formation, distribution, and classification of Iowa soils. W.C. Brown Co., Dubuque, IA.

Skaggs, R.W., J. Van Schilfgaarde, 1999. Agricultural drainage. Agronomy series No. 38, ASA, Madison, WI.

Soil Science Society of America, 1996. Glossary of Soil Science Terms. SSSA Madison WI. Available on line with updates at http://www.soils.org/sssagloss/search.html accessed 04-07-04

Soil Survey Division Staff. 1996. Soil Survey Laboratory Methods Manual. Soil Survey Investigation Report No. 42 (Version 3.0) U.S. Government Printing Office, Washington, D.C.

Soil Survey Staff. 1999. Histosols p. 473 In Soil Taxonomy: a basic system of soil classification for making and interpreting soil surveys. USDA NRCS Agricultural Handbook Number 436 US Gov. Printing Office, Washington, D.C.

Steinwand A.L. and T.E. Fenton, 1995. Landscape Evolution and Shallow Groundwater Hydrology of a Till Landscape in Central Iowa. Soil Sci. Soc. Am. J. 59:1370-1377.

Stevenson, W.H. and P.E. Brown. 1924. Soil Survey of Iowa – Dickinson County. Soil Survey Report No. 37. Iowa Agricultural Experiment Station, Ames.

United States Department of Agriculture. 1999. 1997 Census of Agriculture Iowa State and County Profiles. Available on line at http://www.nass.usda.gov/census/census97/profiles/ia/ia.html

USDA-NRCS. 2004. Soil Use - Hydric Soil Criteria. Available on line with updates http://soils.usda.gov/use/hydric/ accessed 5-12-04

USDA NRCS Soil Survey Division Soil Series Description-Palms. 2003. http://ortho.ftw.nrcs.usda.gov/osd/dat/P/PALMS.html accessed 04-12-04

USDA NRCS Soil Survey Division Soil Series Description-Klossner. 2001. http://ortho.ftw.nrcs.usda.gov/osd/dat/K/KLOSSNER.html accessed 04-12-04

USA National Agricultural Statistics Service. 2004. Available on line with updates at http://www.usda.gov/nass/pubs/pubs.htm accessed 8-16-04.

Voy, Kermit D., N.L. Johnson, T.J. O'Connor, and J.C. Sanner. 1985. Soil Survey of Hardin County, Iowa. USDA-SCS. U.S. Government Printing Office, Washington, D.C.

Voy, K.D., N.L. Johnson, T.J. O'Connor and D.L. Trichler. 1980. Soil Survey of Franklin County, Iowa. USDA-SCS. U.S. Government Printing Office, Washington, D.C.

Walker P.H. 1966. Postglacial Environments in Relation to Landscape and Soils on the Cary Drift, Iowa. Agriculture and Home Economics Experiment Station Research Bulletin 549. Iowa State University, Ames, IA

Walker, P.H. & R.V. Ruhe 1968. Hillslope models and soil formation II. Closed systems. Iowa Agriculture and Home Economic Experiment Station Journal Paper No: J-5736.

Weaver, M.M. 1964. History of Tile Drainage in America prior to 1900. M.M. Weaver, Waterloo, NY.

Weaver, R.W., S. Angle, P. Bottomley, D. Bezdicek, S. Smith, A. Tabatabai, and A. Wollum (eds.). 1994. Methods of Soil Analysis Part 2: Microbiological and biochemical properties. p. 835-863. (SSSA Book Series No. 5) SSSA, Madison, WI.

Weir, W.W. 1950. Subsidence of Peat Land of the San Joaquin Delta, California. Hilgardia, California Agricultural Experiment Station. Vol. 20 no. 3

Wilding, L.P., N.E. Smeck, and G.F. Hall 1983. Pedogenesis and Soil Taxonomy. Elsevier Science Pub. Co. N.Y.

Wooten, H.H., and Jones, L.A. 1955. The history of our drainage enterprises. p. 478-498. In The yearbook of agriculture. USDA, 84th Congress, 1st Session, House Document no. 32, Washington, D.C.

APPENDIX A. SOIL SERIES DESCRIPTIONS

USDA NCRS Official Soil Series Descriptions

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Official Soil Series Descriptions [Online WWW]. Available URL: "http://soils.usda.gov/soils/technical/classification/osd/index.html" [Accessed 14 April 2004]

LOCATION PALMS MI+CT IA IL IN MA MN NY PA VA WI

Established Series

Rev. LWB-WEF-DAG

09/2003

PALMS SERIES

The Palms series consist of very deep, very poorly drained soils formed in herbaceous organic material 16 to 51 inches thick and the underlying loamy deposits in closed depressions on moraines, lake plains, till plains, outwash plains, and hillside seep areas, and on backswamps of flood plains. Permeability is moderately slow to moderately rapid in the organic material, and moderate or moderately slow in the loamy material. Slope ranges from 0 to 6 percent. Mean annual precipitation is about 35 inches, and mean annual temperature is about 50 degrees F.

TAXONOMIC CLASS: Loamy, mixed, euic, mesic Terric Haplosaprists

TYPICAL PEDON: Palms muck, on 1 percent slope under marsh vegetation at an elevation of 648 feet. (Colors are for moist soil unless otherwise stated.)

Oa1--0 to 14 inches; black (10YR 2/1) broken face and rubbed muck (sapric material); about 5 percent fiber, less than 5 percent rubbed; moderate medium granular structure; slightly

sticky; about 20 to 25 percent mineral material; slightly acid (pH 6.5 in water); abrupt smooth boundary.

Oa2--14 to 28 inches; black (10YR 2/1) broken face and rubbed muck (sapric material); about 5 percent fiber, less than 5 percent rubbed; massive parting to weak coarse subangular blocky structure; slightly sticky; 10 to 20 percent mineral material; strongly acid (pH 5.5 in water); clear smooth boundary.

Oa3--28 to 35 inches; black (N 2.5/0) rubbed muck (sapric material); about 5 percent fiber, less than 5 percent rubbed; massive; slightly sticky; 10 to 20 percent mineral material; moderately acid (pH 6.0 in water); abrupt smooth boundary. (Combined thickness of the Oa horizon is 16 to 51 inches.)

Cg--35 to 80 inches; gray (10YR 5/1) clay loam; massive; friable; common medium distinct dark yellowish brown (10YR 4/4) masses of iron oxide accumulation in the matrix; neutral (pH 6.8 in water) in upper part; slightly effervescent, moderately alkaline in lower part.

TYPE LOCATION: Gratiot County, Michigan; north of the flood plain of the Maple River and about 200 feet south of the upland; 1,420 feet south and 820 feet west of the northeast corner of sec. 27, T. 9 N., R. 2 W.; U.S.G.S. Pompeli topographic quadrangle; lat. 43 degrees 8 minutes 31.3 seconds N. and long. 84 degrees 31 minutes 34.7 seconds W., NAD 27; UTM Zone 16, 701165 easting and 4779557 northing, NAD 83.

RANGE IN CHARACTERISTICS: The depth to the loamy C horizon ranges from 16 to 51 inches. The organic material is derived primarily from herbaceous plants, but some layers contain as much as 15 percent woody material. Reaction of the organic material ranges from strongly acid to slightly alkaline. Some organic layers contain carbonates.

The surface tier has hue of 10YR to 5YR, or is neutral; value of 2, 2.5, or 3, and chroma of 0 to 2. It is dominantly sapric material; however, some pedons have hemic material. The subsurface and bottom tiers have hue of 10YR to 5YR, or are neutral; value of 2 to 4, and chroma of 0 to 3. Thin layers, less than 10 inches thick, of hemic material are in some pedons. Thin layers, less than 5 inches thick, of fibric material are in some pedons. Some pedons have a thin layer of sedimentary peat above the C horizon. Some pedons have a thin A horizon above the C horizon.

The C or Cg horizon has hue of 10YR to 5Y, 5GY, or is neutral; value of 3 to 7, and chroma of 0 to 4. It is loamy very fine sand, sandy loam, fine sandy loam, loam, silt loam, silty clay loam, clay loam, or sandy clay loam, or the gravelly analogues of these textures. The upper 12 inches of this horizon averages between 10 and 35 percent clay. Some pedons contain thin strata of fine sand, loamy sand, or silt. Reaction ranges from moderately acid to moderately alkaline. Rock fragment content ranges from 0 to 25 percent and fragments range in size from gravel to stones. Some pedons contain carbonates. Sandy substratum, gravelly substratum, and overwash phases are recognized.

COMPETING SERIES: These are the Klossner, Linwood, Medo, Natchaug (T), Philbon, and Shalcar series. Similar soils are the Adrian, Carlisle, Cathro, Dawson, Edwards, Houghton, Markey, Tawas, and Willette series. Klossner soils have A horizons directly below the organic matter. Linwood soils formed mainly in woody fibers. Medo soils have less than 10 percent clay in the lower 1/3 of the series control section. Natchaug soils are in areas where the mean annual precipitation is greater than 43 inches. Philbon soils have fibric and hemic material in the upper 12 inches. Shalcar soils have a difference between mean annual summer and mean annual winter temperatures that is less than 26 degrees F. Adrian, Dawson,

Markey, and Tawas soils have sandy mineral layers at depths of 16 to 51 inches. In addition, the Dawson, Markey, and Tawas soils have frigid soil temperatures. Carlisle and Houghton soils formed in organic deposits more than 51 inches thick. Cathro soils have frigid soil temperatures. Edwards soils are underlain by marl at depths of 16 to 51 inches. Willette soils have mineral layers that average more than 35 percent clay at depths of 16 to 51 inches.

GEOGRAPHIC SETTING: Palms soils formed herbaceous organic material and the underlying loamy deposits and are in closed depressions on lake plains, till plains, outwash plains, moraines, and hillside seep areas, and on backswamps of flood plains. Slope gradients range from 0 to 6 percent. The soils on nearby uplands are generally loamy. Mean annual temperature ranges from 48 to 53 degrees F., mean annual precipitation ranges from about 30 to 43 inches, frost-free period ranges from 120 to 180 days, and elevation ranges from 580 to 1,530 feet above sea level.

GEOGRAPHICALLY ASSOCIATED SOILS: The Houghton soils are the most common associate and are on similar landform positions. Poorly drained or very poorly drained loamy mineral soils are at the edges of the bogs and are adjacent to Palms soils.

DRAINAGE AND PERMEABILITY: Very poorly drained. The potential runoff for surface runoff is negligible. Permeability is moderately slow to moderately rapid in the organic material, and moderate or moderately slow in the loamy material. The depth to the top of an apparent seasonal high water table ranges from 1 foot above the surface to 1 foot below the surface from November to May in normal years.

USE AND VEGETATION: Most areas of this soil are in marsh vegetation of grasses, reeds, and sedges; and alder, aspen, willow, and dogwood. Some areas have been drained and are used for pasture, corn, and some truck crops.

DISTRIBUTION AND EXTENT: MLRAs 95B, 96, 97, 98, 99, 111, and 115, and possibly in 100, 105, 110, 114, and 120 in the southern part of the lower peninsula of Michigan, Wisconsin, northern Illinois, Indiana, Iowa, Massachusetts, Minnesota, New York, Connecticut, and other northeastern states. The soils are of large extent.

MLRA OFFICE RESPONSIBLE: Indianapolis, Indiana.

SERIES ESTABLISHED: Sanilac County, Michigan; 1955.

REMARKS: Diagnostic horizons and features recognized in this pedon are: organic material from the surface to 35 inches (Oa1, Oa2, and Oa3 horizons); mineral material at depths from 35 to 80 inches - Terric subgroup.

ADDITIONAL DATA: Lab characterization data is available from the National Soil Survey Laboratory, Lincoln, NE. Transect data (T98MI-057-004) for the typical pedon is on file in MLRA project office, Plymouth, Indiana. Transect shows 70 percent Palms soils and 30 percent Houghton soils.

National Cooperative Soil Survey, U.S.A.

LOCATION KLOSSNER MN

Established Series

Rev. TCJ-KDS-AGG

05/2001

KLOSSNER SERIES

The Klossner series consists of very deep, very poorly drained soils formed in well decomposed organic material 16 to 50 inches thick overlying loamy deposits on moraines, till plains, lake plains, flood plains, and hillside seep areas. They have moderately slow to moderately rapid permeability in the organic material, and moderate or moderately slow permeability in the loamy material. Slopes range from 0 to 8 percent. Mean annual precipitation is about 28 inches. Mean annual temperature is about 47 degrees F.

TAXONOMIC CLASS: Loamy, mixed, euic, mesic Terric Haplosaprists

TYPICAL PEDON: Klossner muck - with a 1 percent slope in a cultivated field. (Colors are for moist soil unless otherwise stated.)

Oap--0 to 10 inches; black (N 2/0) muck, very dark gray (10YR 3/1) dry; about 20 percent fiber, less than 5 percent rubbed; weak fine subangular blocky structure; very friable; many very fine roots; moderately acid; abrupt smooth boundary.

Oa--10 to 26 inches; black (10YR 2/1) muck, dark gray (10YR 4/1) dry; about 60 percent fiber, about 6 percent rubbed; weak fine subangular blocky structure; very friable; many very fine roots; moderately acid; gradual smooth boundary. (Combined thickness of O horizon is 16 to 50 inches.)

2A1--26 to 36 inches; black (N 2/0) mucky silty clay loam; weak medium subangular blocky structure; friable; few very fine roots; slightly acid; gradual smooth boundary.

2A2--36 to 48 inches; black (N 2/0) silty clay loam; massive; friable; few dark reddish brown (5YR 3/4) iron oxide concentrations in root channels; about 1 percent gravel; neutral; gradual wavy boundary. (Combined thickness of 2A horizon is 8 to 45 inches thick.)

2Cg1--48 to 65 inches; olive gray (5Y 5/2) clay loam; massive; friable; dark reddish brown (5YR 3/4) Fe oxide concentrations in root channels; many medium prominent yellowish brown (10YR 5/6) Fe concentrations; about 1 percent gravel; slightly effervescent; slightly alkaline; gradual wavy boundary.

2Cg2--65 to 80 inches; gray (5Y 5/1) loam, massive; friable; many medium prominent light olive brown (2.5Y 5/4) and yellowish brown (10YR 5/4) Fe concentrations; about 3 percent gravel; slightly effervescent; slightly alkaline.

TYPE LOCATION: Nicollet County, Minnesota; 2600 feet north and 2300 feet east of the southwest corner, sec. 12, T. 110 N., R. 28 W.; USGS Nicollet quadrangle; lat. 44 degrees 20 minutes 53 seconds N. and long. 94 degrees 8 minutes 28 seconds W., NAD27.

RANGE IN CHARACTERISTICS: The thickness of the organic material ranges from 16 to 50 inches. It is derived primarily from herbaceous plants. The organic matter content ranges from 25 to 60 percent in the organic surface and 5 to 20 percent in the 2A horizon. The reaction of the organic material ranges from moderately acid to slightly alkaline. Some organic layers contain free carbonates.

The O horizon has hue of 10YR, 5YR, or is neutral, value of 2 or 3 and chroma of 0 to 2. It is dominantly muck (sapric material) however, some pedons have thin layers of hemic material, less than 10 inches thick.

Some pedons have highly organic mineral plow layers.

The 2A horizon has hue of 10YR, 2.5Y, 5Y or is neutral, value of 2 or 3 and chroma of 0 to 1. It is loam, silt loam, sandy clay loam, silty clay loam, clay loam or mucky modifiers of these textures. It is moderately acid to slightly alkaline. Some pedons contain thin layers of coprogenous earth.

The 2Cg horizon has hue of 10YR, 2.5Y, 5Y, 5GY, or is neutral, value of 2 to 7 and chroma of 0 to 2. It is loam, silt loam, silty clay loam, clay loam, sandy clay loam, sandy loam or fine sandy loam, or their gravelly or cobbly analogues. It is slightly acid to moderately alkaline. The upper 12 inches of this horizon averages less than 35 percent clay. Some pedons contain thin strata of fine sand, loamy sand, or silt. Gravel or cobble sized rock fragments range from 0 to 25 percent by volume. Some pedons contain free carbonates. Sandy substratum and ponded phases are recognized.

COMPETING SERIES: These are Linwood, Medo, Palms, Philbon and Shalcar series. Linwood soils have well expressed granular structure to depths of more than 12 inches and formed mainly in woody fibers. Medo soils have sandy textures in the lower part of the series control section. Palms soils have organic matter content greater than 75 percent and do not have an A horizon directly below the organic material. Philbon soils have fibric and hemic material in the upper 12 inches. Shalcar soils ave less than 26 degrees difference between mean January and mean July temperatures.

GEOGRAPHIC SETTING: Klossner soils are in basins that were formerly lakes or ponds, lake plains, till plains, flood plains, or moraines. They are also on hillside seep areas in moraines and sideslopes of river valleys. Slopes range from 0 to 8 percent. The soils on nearby uplands are generally loamy. The mean annual temperature ranges from 45 to 50

degrees F. The mean annual precipitation ranges from 24 to 32 inches. Frost free days range from 110 to 160. Elevations above sea level range from 800 to 1400 feet.

GEOGRAPHICALLY ASSOCIATED SOILS: The main ones are the Canisteo, Harps, Okoboji, Glencoe, Muskego and Houghton soils. Canisteo and Harps soils are on the rims of depressions. Glencoe and Okoboji are at the outer edges of the depressions. Muskego and Houghton soils are in larger depressions.

DRAINAGE AND PERMEABILITY: Very poorly drained. Surface runoff is negligible. Permeability is moderately slow to moderately rapid in the organic layers and moderate or moderately slow in the loamy material.

USE AND VEGETATION: The greater part of this soil is cultivated to corn, soybeans, small grains and specialty crops such as vegetables or grass sod. Other areas are in vegetation of grasses, reeds, sedges, alder, aspen, or willow. Some of the hillside seep areas are set aside as natural areas and called fens.

DISTRIBUTION AND EXTENT: The south central and southeast part of Minnesota and possibly northern Iowa. The series is extensive.

MLRA OFFICE RESPONSIBLE: St. Paul, Minnesota

SERIES ESTABLISHED: Nicollet County, Minnesota, 1989.

REMARKS: Diagnostic horizons and features recognized are: sapric soil materials from the surface to about 26 inches; loamy mineral material from 26 to 50 inches or more; aquic moisture regime. This soil was formerly included in the Palms Series in Minnesota.

ADDITIONAL DATA: Refer to MAES-CFC#'s 2697, 3251, 3400 and 3475.

National Cooperative Soil Survey, U.S.A.

APPENDIX B. CORE DESCRIPTIONS

Core Identification	BOO-01							Weather				Cool and dry			
Core Location	118.87 m east and 701.04 m north of the southwest corner of sec. 6, T.85N., R.25W.							% slope				0-2			
Collection Date	10/2/2000							Vegetation/Cropping Systems				cool season pasture			
Diameter (cm)	6.34							Described by				B. Larabee			
Length (cm)	126. 0							Description Date				5/28/2002			
County	Boone							Classification				Typic Calciaquoll			
									Sturcture						
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	% Total Carbon	Effervescence	pH
BOO-01-01	01-0922	Ap	6.34	19.00	10YR2/1	2	fr	3	2	m	gr	MS	7.5	NE	6.81
BOO-01-02	01-0923	A 1	6.34	45.00	10YR2/1	1	fr	2	2	m & f	gr	MS	3.5	NE	6.9
BOO-01-03	01-0924	A2	6.34	60.00	10YR2/1	0	fr	1	1	none	gr bk. sg	SL	1.8	NE	7.16
BOO-01-04	01-0925	A3	6.34	93.50	10YR2/1 2.5Y4/2	0	fi	<1	1 & none	none	m bk. sg	SL	0.6	VS	7.84
BOO-01-05	01-0926	Ag	6.34	101.50	10YR2/1 2.5Y4/2	0	fi	0	1 & none	none	m bk. sg	SL	1.0	SL	8.18
BOO-01-06	01-0927	AC	6.34	118.50	10YR2/1 2.5Y3/2	0	fi	0	1 & none	none	m bk. sg	SIL	1.7	SL	8.16
BOO-01-07	01-0928	Cg	6.34	126.00	2.5Y6/4 2.5Y4/2	0	fi	0	1 & none	none	m bk. sg	SIL	2.6	ST	8.19
BOO-01-01	f & vf roots, few f & vf pores, very sandy with some fine gravel														
BOO-01-02	f & vf roots, few f & vf pores with faint linings 10YR3/3, small areas of 2.5Y4/2														
BOO-01-03	f & vf roots,common f & vf pores with linings 10YR3/3, small areas of 2.5Y4/2														
BOO-01-04	f & vf roots,common f & vf pores with linings 10YR3/3, few gravel sized fragments														
BOO-01-05	f & vf pores with linings 2.5YR3/6, small areas 2.5YR6/4														
BOO-01-06	f & vf pores with linings 2.5YR3/6, small areas 2.5YR6/4														
BOO-01-07	f & vf pores with linings 2.5YR3/6, small areas 2.5YR6/4														

Core Identification	BOO-02							Weather				Cool and dry			
Core Location	118.87 m east and 701.04 m north of the southwest corner of sec. 6, T.85N., R.25W.							% slope				0-2			
Collection Date	10/2/2000							Vegetation/Cropping Systems				cool season pasture			
Diameter (cm)	6.44							Described by				B. Larabee			
Length (cm)	108.5							Description Date				5/29/2002			
County	Boone							Classification				Typic Calciaquoll			
									Sturcture						
ID Number	Sample	Horizon	Diameter	Maximum Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	% Total Carbon	Effervescence	pH
BOO-02-01	01-0929	Ap	6.44	26	10YR2/1	2	fr	2	2	m	gr	SM	7.1	NE	7.07
BOO-02-02	01-0930	A 1	6.44	39.5	10YR2/1 2.5Y4/2	1	fr	1	2	f	gr	SM	2.6	NE	6.69
BOO-02-03	01-0931	A2	6.44	52	7.5YR2.5/1	0	fr	<1	0	none	sg	LS	1.2	NE	7.1
BOO-02-04	01-0932	A3	6.44	75.5	10YR2/1 7.5YR2.5/1	0	fi	0	1 & none	none	m bk. sg	SL	1.5	NE	7.054
BOO-02-05	01-0933	AC	6.44	93	10YR3/1 7.5YR2.5/1	0	fi	0	1 & none	none	m bk. sg	SL	0.8	SL	7.85
BOO-02-06	01-0934	Cg	6.44	108.5	10YR3/1 5Y4/2	0	fi	0	1 & none	none	m bk. sg	LS	1.2	SL	7.9
BOO-02-01	plant residue on surface, m, f & vf roots, many m, f & vf pores														
BOO-02-02	m, f & vf roots, many m, f & vf pores, many <1cm sand lenses														
BOO-02-03	vf roots, mostly sand with 0.5cm lenses of organic material														
BOO-02-04	vf roots, many m, f & vf pores lined with 7.5YR3/4, rare calcite mass 5Y8/1, small areas of 2.5Y5/1, one sand filled vertical pore														
BOO-02-05	common f & vf pores lined with 7.5YR3/4, coarse sand, few calcite masses 5Y8/1, few small stones														
BOO-02-06	common f & vf pores lined with 7.5YR3/4, few calcite masses 5Y8/1 , few<1 cm sand lenses 7.5YR2.5/1														

Core Identification	BOO-03							Weather				Cool and dry			
Core Location	118.87 m east and 701.04 m north of the southwest corner of sec. 6, T.85N., R.25W.							% slope				0-2			
Collection Date	10/2/2000							Vegetation/Cropping Systems				cool season pasture			
Diameter (cm)	6.39							Described by				B. Larabee			
Length (cm)	124.5							Description Date				5/29/2002			
County	Boone							Classification				Typic Calciaquoll			
									Sturcture				% Total		
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Carbon	Effervescence	pH
BOO-03-01	01-0935	Ap	6.39	23.00	10Y2/1	1	fr	2	2	m	gr	SM	7.4	NE	7.00
BOO-03-02	01-0936	A 1	6.39	65.50	10YR2/1 2.5Y4/2	<1	fi	1	1 & none	none	m bk. sg	SM	1.4	NE	7.10
BOO-03-03	01-0937	A2	6.39	83.00	10YR2/1 2.5Y4/2	0	fi	<1	1 & none	none	m bk. sg	SL	1.2	NE	7.09
BOO-03-04	01-0938	A3	6.39	95.00	10YR3/1 2.5Y5/2 2.5Y4/2	0	fi	0	1	f	sbk	SL	1.0	VS	7.30
BOO-03-05	01-0939	Acg	6.39	111.00	10YR2/1 2.5Y4/2	0	fi	0	2	f	sbk	SL	1.4	ST	7.81
BOO-03-06	01-0940	Cg	6.39	124.50	2.5Y4/2 2.5Y6/3	0	fi	0	2	m	sbk	SIL	2.5	ST	7.96
BOO-03-01	plant residue on surface, f & vf roots,														
BOO-03-02	vf roots, f & vf pores lined with faint 7.5YR4/4 many <0.5cm sand lenses.														
BOO-03-03	m, f & vf pores lined with faint 7.5YR4/4, <0.5 cm sand lenses, 2 cm lense 5Y8/1 not effervescent														
BOO-03-04	vf roots, m, f & vf pores lined with 2.5YR3/6, <0.5 cm sand lenses that are both vertical and horizontal														
BOO-03-05	f & vf pores lined with 2.5YR3/6, <0.5 cm sand lenses that are both vertical and horizontal														
BOO-03-06	f & vf pores lined with 2.5YR3/4, 2.5Y4/2 seems to fill vertical cracks.														

Core Identification	CER-03-01							Weather				cold and clear				
Core Location	223.42 m west and 23.47m south of the north east corner of sec. 15, T.97N., R.22W.							% slope				0-1				
Collection Date	11/8/2001							Vegetation/Cropping Systems				Corn and Bean rotation				
Diameter (cm)	4.21							Described by				B. Larabee				
Length (cm)	120.0							DescriptionDate				1/8/2003				
County	Cerro Gordo							Classification				Terric Haplosaprist				
									Sturcture							
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	% Total Carbon	Effervescence	pH
CER-03-01-01	01-1266	Oap	4.21	6.0	10YR2/1	1	fr	0	1	vf	gr	M	A	17.6	NE	7.19
CER-03-01-02	01-1267	Oa1	4.21	19.0	10YR2/1	<1	fr	<1	2	f	gr	M	A	19.5	NE	6.71
CER-03-01-03	01-1268	Oa2	4.21	41.0	10YR2/1	<1	fr	2	1 & 1	m & f	gr	M	A	17.2	NE	7.70
CER-03-01-04	01-1269	Oa3	4.21	55.0	10YR2/2	0	fr	<1	2	f	gr	SIL	C	9.4	SL	6.48
CER-03-01-05	01-1270	2Ag	4.21	70.0	10YR1/3 & 5Y4/2	0	fr	0	0	none	m	SIL	A	2.3	ST	7.90
CER-03-01-06	01-1271	2Ag2	4.21	97.5	5Y4/2 & 5YR3/4	0	fi	0	0	none	m	SIL	C	2.3	VE	7.95
CER-03-01-07	01-1272	2Cg	4.21	120.0	2.4Y4/2	0	fi	0	0	none	m	SIL		1.6	ST	7.96
CER-03-01-01	almost powder, quartz grain visible on ped surfaces, crop remnants on soil surface															
CER-03-01-02	vf roots, no visible pores, crop remnants mixed in horizon, quartz grains visible on ped surfaces															
CER-03-01-03	vf roots, no visible pores, crop remnants mixed in horizon, quartz grains visible on ped surfaces															
CER-03-01-04	vf roots, less than 1 percent powdery carbonates 5Y8/2 in color, ST effervescence															
CER-03-01-05	common f & vf pores lined with 10YR3/4, <1% oxidation feature 10YR3/4, few 0.5cm powdery carbonate 5Y8.2 in color ,ST effervescence															
CER-03-01-06	many f & vf pores lined with 10YR3/2, 15% oxidized 5YR3/4, few purple black manganese concentrations															
CER-03-01-07	many f & vf pores lined with 5YR3/4, <1% oxidation feature 10YR3/4															

Core Identification	CER-03-02							Weather				cold and clear				
Core Location	223.42 m west and 23.47m south of the north east corner of sec. 15, T.97N., R.22W.							% slope				0-1				
Collection Date	11/8/2001							Vegetation/Cropping Systems				Corn and Bean rotation				
Diameter (cm)	4.20							Described by				B. Larabee				
Length (cm)	120.0							DescriptionDate				2/17/2003				
County	Cerro Gordo							Classification				Terric Haplosaprist				
									Sturcture							
ID Number	Sample	Horizon	Diameter	Maximum	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	% Total Carbon	Effervescence	pH
CER-03-02-01	01-1298	Oap	4.20	10.0	10YR2/1	0	fi	<1	1	f	gr	M	A	15.8	NE	7.09
CER-03-02-02	01-1299	Oa1	4.20	40.0	10YR2/1	0	fr	<1	1	f	gr	M	A	19.1	NE	6.66
CER-03-02-03	01-1300	Oa2	4.20	49.5	10YR2/1	0	fi	0	1	f	gr	MSIL	A	9.9	NE	6.27
CER-03-02-04	01-1301	2A	4.20	61.0	10YR2/1	0	fr	0	1	f	gr	SIL	A	7.2	NE	6.91
CER-03-02-05	01-1302	2A2	4.20	120.0	10YR2/1	0	fr	0	0	none	m & sg	SIL		2.2	VS	7.20
CER-03-02-01																
CER-03-02-02																
CER-03-02-03	no roots or pores, quartz grains visible on ped surfaces															
CER-03-02-04	no roots or pores, quartz grains visible on ped surfaces															
CER-03-02-05	many f and vf pores, no oxidation, sand lenses dispursed throughout horizon 5Y5/2 in color															

Core Identification	CER-03-03							Weather				cold and clear				
Core Location	223.42 m west and 23.47m south of the north east corner of sec. 15, T.97N., R.22W.							% slope				0-1				
Collection Date	11/8/2001							Vegetation/Cropping Systems				Corn and Bean rotation				
Diameter (cm)	4.14							Described by				B. Larabee				
Length (cm)	124.5							DescriptionDate				2/12/2003				
County	Cerro Gordo							Classification				Terric Haplosaprist				
									Sturcture							
ID Number	Sample	Horizon	Diameter	Maximum	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	% Total Carbon	Effervescence	pH
CER-03-03-01	01-1303	Oa	4.14	50.5	10YR2/1	0	fr	1	2	f & vf	gr	M	A	17.3	NE	6.74
CER-03-03-02	01-1304	Oa2	4.14	81.5	5Y4/2 & 5Y3/2	0	fr	0	1	vf	sbk	M	C	17.4	SL	6.75
CER-03-03-03	01-1305	2C	4.14	91.0	5Y4/2 & 5Y3/2	0	fr	0	2	vf	sbk	MSIL	C	1.9	ST	8.00
CER-03-03-04	01-1306	2C2	4.14	124.5	5Y3/2	0	fr	0	2	vf	sbk	SIL		3.9	ST	8.04
CER-03-03-01	crop remnants, vf roots, few vf pores, sand grains visible on ped surfaces															
CER-03-03-02	common m & f pores, 50% of pores lined with 10YR3/4, 2% redox features, few worm casts.															
CER-03-03-03	Common m & f pores lined with 10YR3/4, 20% redox features, few worm casts.															
CER-03-03-04	many m & f pores lined with 10YR3/5, 2% oxidized 10YR3/6, few purple-black manganese concentrations, few organins, few clay skins															

Core Identification	CLA-01							Weather				warm and sunny				
Core Location	426.72 m north and 685.80 m west of the south east corner of sec. 11, T.97N., R.35W.							% slope				0-1				
Collection Date	7/11/2001							Vegetation/Cropping Systems				CRP Switchgrass and Big Bluestem				
Diameter (cm)	3.81							Described by				B. Larabee				
Length (cm)	115							DescriptionDate				7/30/2001				
County	Clay							Classification				Histic Endoaquoll				
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Sturcture Grade	Size	Shape	Texture	Boundary	% Total Carbon	Effervescence	pH
CLA-01-01	01-0756	Oap	3.81	19.00	7.5YR2.5/1	1	vfr	15	2	M & F	gr	M	A	12.5	NE	6.72
CLA-01-02	01-0757	2A	3.81	37.00	7.5YR2.5/1	0	vfr	2	2	TN & M	pl	M	A	4.5	SL	7.61
CLA-01-033	01-0758	2A2	3.81	56.00	10YR2/1	0	fr	2	2	VF	sbk	MSICL	G	4.2	NE	7.34
CLA-01-04	01-0759	2A3	3.81	76.50	10YR2/1	0	fr	<1	1	none	m	SICL	G	3	NE	7.73
CLA-01-05	01-0760	2A4	3.81	95.00	10YR2/1	0	fr	<1	1	none	m	SICL	G	2.7	VS	7.69
CLA-01-06	01-0761	2A5	3.81	115.00	10YR2/2	0	fr	0	1	none bk. F	m bk. sbk	SICL		3.1	VS	7.49
CLA-01-01	m, f & vf roots in a mat throughout horizon															
CLA-01-02	f &vf roots, few snail shells visible, 3 silt lenses about 2 cm in thickness 2.5Y6/4															
CLA-01-03	f &vf roots															
CLA-01-04	vf roots, few f &vf pores lined with 2.5YR5/8, common snail shells and shell fragments,															
CLA-01-05	vf roots, few f &vf pores lined with 2.5YR5/8, common snail shells and shell fragments, few concretions 10YR8/1 in color, SL effervescence															
CLA-01-06	vf roots, few f and vf pores lined with 2.5YR5/8, common ssnail shells and shell fragments															

Core Identification	CLA-02							Weather				warm and sunny				
Core Location	426.72 m north and 685.80 m west of the south east corner of sec. 11, T.97N., R.35W.							% slope				0-1				
Collection Date	7/11/2001							Vegetation/Cropping Systems				CRP Switchgrass and Big Bluestem				
Diameter (cm)	3.71							Described by				B. Larabee				
Length (cm)	127							DescriptionDate				7/30/2001				
County	Clay							Classification				Histic Endoaquoll				
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Sturcture Grade	Size	Shape	Texture	Boundary	% Total Carbon	Effervescence	pH
CLA-02-01	01-0762	Oap	3.71	24.00	7.5YR 2.5/1	1	vfr	15	2	M	gr	M	C	12.3	VS	6.73
CLA-02-02	01-0763	2A	3.71	41.00	7.5YR 2.5/1	1	vfr	3	2	TN & M bk. F	pl bk. sbk	M	A	5.4	ST	7.63
CLA-02-03	01-0764	2A2	3.71	65.00	10YR2/1	0	fr	<1	1	F	sbk	M	C	4.4	NE	7.29
CLA-02-04	01-0765	2A3	3.71	81.00	10YR2/1	0	fr	<1		F	m bk. sbk	MSICL	G	2.7	SL	7.52
CLA-02-05	01-0766	2A4	3.71	97.50	10YR2/1	0	fr	<1	1 bk. 1	none bk. F	m bk. sbk	SICL	G	2.7	SL	7.67
CLA-02-06	01-0767	2A5	3.71	117.50	10YR2/2	0	fr	<1	1 bk. 1	none bk. F	m bk. sbk	SICL	A	2.8	SL	7.66
CLA-02-07	01-0768	2AC	3.71	127.00	10YR3/2	0	fr	0	1 bk. 1	none bk. F	m bk. sbk	SICL		3.2	ST	7.74
CLA-02-01	m, f & vf roots in a mat throughout horizon															
CLA-02-02	m, f, & vf roots															
CLA-02-03	f & vf roots, one discrete 3cm lense at 33 cm depth , several other 0.5 cm lenses 2.5Y6/3 in color															
CLA-02-04	vf roots, few vf pores lined with 5YR4/5 oxidation, common snail shells and fragments															
CLA-02-05	vf roots, few vf pores lined with 2.5YR2.5/54 oxidation, discrete 0.5 cm silty lenses 2.5Y6/3 in color,															
CLA-02-06	vf roots, few vf pores lined with 2.5Y2.5/4 oxidation, common snail shells															
CLA-02-07	vf roots, vf pores lined with 2.5Y2.5/4															

Core Identification	CLA-03							Weather				warm and sunny				
Core Location	426.72 m north and 685.80 m west of the south east corner of sec. 11, T.97N., R.35W.							% slope				0-1				
Collection Date	7/11/2001							Vegetation/Cropping Systems				CRP Switchgrass and Big Bluestem				
Diameter (cm)	3.93							Described by				B. Larabee				
Length (cm)	123							DescriptionDate				7/30/2001				
County	Clay							Classification				Histic Endoaquoll				
				Max.	Moist	%		%	Sturcture					% Total		
ID Number	Sample	Horizon	Dia.	Depth	Matrix	Fiber	Consistance	Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH
CLA-03-01	01-0769	Oap	3.93	20.00	7.5YR 2.5/1	1	vfr	17	1	M & F	gr	M	C	12.4	NE	6.59
CLA-03-02	01-0770	2A	3.93	28.50	7.5YR 2.5/1	<1	fr	3	1 bk. 1	TN & M bk. F	pl bk. sbk	MSICL	A	4.5	ST	7.31
CLA-03-03	01-0771	2A2	3.93	56.50	10YR2/1	0	fr	1	1	VF	sbk	MSICL	C	4.7	NE	7.16
CLA-03-04	01-0772	2A3	3.93	77.00	10YR2/1	0	fr	<1	1 bk. 1	NONE bk. F	m bk. sbk	MSICL	G	2.4	VS	7.55
CLA-03-05	01-0773	2A4	3.93	108.00	10YR2/1	0	fr	<1	1 bk. 1	NONE bk. F	m bk. sbk	SICL	G	2.7	VS	7.61
CLA-03-06	01-0774	2AC	3.93	123.00	10YR2/2	0	fr	<1	1 bk. 1	NONE bk. F	m bk. sbk	SICL		3.3	ST	7.75
CLA-03-01	m, f & vf roots in a mat throughout horizon															
CLA-03-02	m,f, & vf roots, many snail shell fragments,															
CLA-03-03	vf roots, few snail shells and fragments															
CLA-03-04	vf roots, few f & vf prores lined with 2.5YR3/6 oxidation, common snail shells and fragments															
CLA-03-05	vf roots, few f & vf pores lined with 2.5YR/36 oxidation,several <0.5cm silt lneses 10YR4/3															
CLA-03-06	vf roots, few vf pores lined with 2.5YR3/6 few snail shells and fragments															

Core Identification	EMM-01							Weather				dry, cloudy				
Core Location	792.48 m east and 103.63 m north of southwest corner sec. 2, T.99.N., R.32W.							% slope				0-2				
Collection Date	11/16/2001							Vegetation/Cropping Systems				corn/bean, no crop this year , ponding				
Diameter (cm)	4.21							Described by				B. Larabee				
Length (cm)	114.5							DescriptionDate				5/30/2002				
County	Emmet							Classification				Histic Endoaquoll				
									Sturcture							
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	% Total Carbon	Effervescence	pH
EMM-01-01	01-0941	Oap	4.21	21.50	10YR2/1	<1	fr	1	2	vf	gr	M	A	14.5	NE	6.29
EMM-01-02	01-0942	2A	4.21	33.00	10YR2/1	0	fr	<1	2	vf	gr	L	A	3.3	NE	7.51
EMM-01-03	01-0943	2A2	4.21	45.50	7.5YR3/1 2.5YR3/2	0	fr	0	1	vf	sbk	L	C	3.4	VS	8.06
EMM-01-04	01-0944	2Bwg	4.21	62.00	2.5Y5/2 2.5Y4/2	0	fi	0	2	vf	sbk	L	C	3.1	SL	8.19
EMM-01-05	01-0945	2Bwg2	4.21	87.50	2.5Y5/2	0	fi	0	2	vf	sbk	SIL	G	3.0	SL	8.18
EMM-01-06	01-0946	2Bwg3	4.21	114.50	2.5Y5/2 5YR4/6	0	fi	0	2	vf	sbk	SIL		2.3	SL	8.17
EMM-01-01	vf roots, powdery															
EMM-01-02	vf roots, few m, f & vf pores, 10YR7/2 <-0.5 cm stones no to very slight effervescence															
EMM-01-03	vf pores-few lined with 5YR3/4, rare stones 10YR7/2 appear quartz, few organins															
EMM-01-04	f & vf pores lined with 5YR4/6, few mottles 5YR4/6, few clay skins, common organins															
EMM-01-05	m, f & vf pores lined with 5YR4/6, few very coarse promenant mottles 5YR4/6, common clay skins, common organin															
EMM-01-06	f & vf pores lined with 5YR4/6, mottles (5%) very coarse prominent 5YR4/6,															

Core Identification	EMM-02							Weather				dry, cloudy				
Core Location	792.48 m east and 103.63 m north of southwest corner sec. 2, T.99.N., R.32W.							% slope				0-2				
Collection Date	11/16/2001							Vegetation/Cropping Systems				corn/bean, no crop this year , ponding				
Diameter (cm)	4.18							Described by				B. Larabee				
Length (cm)	122.0							DescriptionDate				5/30/2002				
County	Emmet							Classification				Histic Endoaquoll				
									Sturcture							
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	% Total Carbon	Effervescence	pH
EMM-02-01	01-0947	Oap	4.18	21.50	10YR2/1	<1	fr	1	1	f	gr	M	A	15.2	NE	6.26
EMM-02-02	01-0948	2A	4.18	33.00	10YR2/1	0	fr	<1	1	f	gr	ML	C	3.6	NE	7.52
EMM-02-03	01-0949	2A2	4.18	44.50	10YR3/1 2.5Y3.1 2.5Y4/2	0	fr	<1	1	f	gr	L	C	1.9	SL	7.93
EMM-02-04	01-0950	2Bwg	4.18	62.00	2.5Y4//2 2.5Y5/2	0	fr	0	1	f	sbk	L	C	3.5	SL	8.12
EMM-02-05	01-0951	2Bwg2	4.18	73.50	2.5Y4//2 2.5Y5/2	0	fr	0	1	f	sbk	SL	C	3.0	SL	8.07
EMM-02-06	01-0952	2Bwg3	4.18	89.00	2.5Y5/2 2.5Y5/4	0	fr	0	1	f	sbk	SL	G	2.5	SL	8.04
EMM-02-07	01-0953	2Bwg4	4.18	122.00	7.5YR6/2 2.5YR6/2	0	fr	0	1	f	sbk	SL		2.4	SL	7.96
EMM-02-01	crop residue, very powdery few vf roots															
EMM-02-02	vf roots, f & vf pores, few gravel size stones f 10YR7/2															
EMM-02-03	common f &vf pores lined with 5YR 3/4 few gravel size stones f 10YR7/2															
EMM-02-04	common f & vf pores lined with 5YR3/4 , few mottles oxidized 5Y3/4															
EMM-02-05	common f & vf pores lined with 5YR3/4 , 3% mottles oxidized 5Y3/4															
EMM-02-06	f & vf pores lined with 10YR3/4 , 3% oxidized 5Y3/4 few organins, common clay skins															
EMM-02-07	strong mottling, 25% 7.5YR4/6															

Core Identification	EMM-03							Weather				dry, cloudy				
Core Location	792.48 m east and 103.63 m north of southwest corner sec. 2, T.99.N., R.32W.							% slope				0-2				
Collection Date	11/16/2001							Vegetation/Cropping Systems				corn/bean, no crop this year , ponding				
Diameter (cm)	4.21							Described by				B. Larabee				
Length (cm)	117.0							DescriptionDate				5/31/2002				
County	Emmet							Classification				Histic Endoaquoll				
									Sturcture							
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	% Total Carbon	Effervescence	pH
EMM-03-01	01-0954	Oap	4.21	22.50	10YR2/1	<1	fr	1	1	f	gr	M	A	14.6	NE	6.73
EMM-03-02	01-0955	2A	4.21	35.00	10YR2/1	<1	fr	<1	2	f	gr	M	A	2.8	NE	7.60
EMM-03-03	01-0956	2AB	4.21	47.50	2.5Y3/1 2.5Y4/2	0	fr	0	1	f	sbk	L	C	1.3	SL	7.97
EMM-03-04	01-0957	2Bwg	4.21	59.00	2.5Y3/1 2.5Y5/2	0	fr	0	1	vf	sbk	L	C	2.7	SL	8.01
EMM-03-05	01-0958	2Bwg2	4.21	80.50	2.5y4/2 2.5Y5/2	0	fr	0	1	vf	sbk	SIL	G	2.8	SL	8.04
EMM-03-06	01-0959	2Bwg3	4.21	117.00	2.5Y5/2 2.5Y4/3	0	fr	0	1	vf	sbk	SIL		2.3	SL	8.00
EMM-03-01	crop residue,vf roots															
EMM-03-02	vf roots, f & vf pores,few small stones 1-2cm															
EMM-03-03	vf pores lined with 5YR3/4, <1cm sand lense, few small stones 1-2 cm 10YR7/2 very slightly effervescent															
EMM-03-04	commn vf pores lined with 5YR3/4, few clay skins,															
EMM-03-05	common f & vf pores lined with 5YR3/4, few clay coatings, few organins															
EMM-03-06	few f & vf pores lined with 7.5YR4/6, 25% mottled oxidized 7.5YR4/6, common clay coatings, few organins															

Core Identification	FRA-01							Weather				sunny and warm				
Core Location	106.7 m north & 39.6 m west of the sough east corner of sec. 35, T. 92 N.,							% slope				0-2				
Collection Date	6/15/2001							Vegetation/Cropping Systems				bean (corn) rotation				
Diameter (cm)	3.80							Described by				B. Larabee				
Length (cm)	100.0							DescriptionDate				6/26/2002				
County	Franklin							Classification				Terric Haplosaprsit				
									Sturcture					% Total		
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH
FRA-01-01	01-0989	Oap	3.80	19.00	10YYR2/1	<1	fr	<1	1	F	gr	M	C	16.5	NE	5.96
FRA-01-02	01-0990	Oa	3.80	50.50	10YR2/1	0	fr	<1	1&1	VN & F	PL bk gr	M	A	12.3	NE	6.87
FRA-01-03	01-0991	2ACg	3.80	68.50	10YR2/1 5Y4/1	0	fr	0	1 & 2	none & F	m &gr	SIL	C	3.7	VS	7.41
FRA-01-04	01-0992	2Cg	3.80	85.50	5Y4/1	0	1	0	none	none	sg	SL	A	1.6	ST	7.92
FRA-01-05	01-0993	2C2g	3.80	89.00	5Y5/1	0	1	0	none	none	sg	FS	A	1.3	VS	7.91
FRA-01-06	01-0994	2C3g	3.80	#####	5Y4/2 5Y4/1	0	1	0	1		m &gr	SIL		1.8	SL	7.85
FRA-01-01	few crop remnants, sand grains visible on ped surfaces															
FRA-01-02	few vf pores lined with 5YR4/4 sand grains visible on ped surfaces															
FRA-01-03	few vf pores lined with 5YR4/4 several sand lenses <1 cm in thickness															
FRA-01-04	few vf pores lined with 5YR4/4 very sandy few 1-2 cm gravel															
FRA-01-05	loose fine sand															
FRA-01-06	no visible pores, layers of loose land with fine silty clay lesnes <1cm n															

Core Identification	FRA-02							Weather				sunny and warm				
Core Location	106.7 m north & 39.6 m west of the sough east corner of sec. 35, T. 92 N.,							% slope				0-2				
Collection Date	6/15/2001							Vegetation/Cropping Systems				bean (corn) rotation				
Diameter (cm)	4							Described by				B. Larabee				
Length (cm)	95.5							DescriptionDate				6/26/2002				
County	ranklin							Classification				Terric Haplosaprsit				
									Sturcture					% Total		
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH
FRA-02-01	01-0995	Oap	4.00	19.50	10YR2/1	<1	fr	<1	1	f	gr	M	G	14.3	NE	5.16
FRA-02-02	01-0996	Oa	4.00	44.50	10YR2/1	<1	fr	<1	1 bk.1	VN bk. f	PL bk. Gr	M	V	16.4	NE	6.10
FRA-02-03	01-0997	2A	4.00	56.50	10YR2/1	0	fr	0	1bk. 1	none bk. f	m bk. gr	SL	A	5.6	VS	7.22
FRA-02-04	01-0998	2Ag	4.00	63.50	10YR2/1 5Y4/1	0	fr	0	1& none	none & none	m & sg	SL	A	1.9	SL	7.51
FRA-02-05	01-0999	2ACg	4.00	68.50	5Y4/1	0	fr	0	1bk. 1	none bk. f	m bk. gr	L	A	2.1	SL	7.62
FRA-02-06	01-1000	2Cg	4.00	76.50	5Y4/1	0	fr	0	1	f	s	SL	A	1.9	ST	7.55
FRA-02-07	01-1001	2C2g	4.00	89.50	10YR5/1 5Y4/1	0	fr	0	1& none	none & none	m & sg	SL	A	1.9	ST	7.88
FRA-02-08	01-1002	2C2g	4.00	95.50	10YR5/1 5Y4/1	0	fr	0	1& none	none & none	m & sg	LS		1.5	ST	7.87
FRA-02-01	crop remnants visible, vf roots, sand grain visible on ped surfaces															
FRA-02-02	crop remnants visible, vf roots, few vf pores lined with 5YR4/4, sand grain visible on ped surfaces															
FRA-02-03	few vf pores lined with 5YR4/4, sand grains visible on ped surfaces															
FRA-02-04	no pores visible, coarse and very coarse sand and fine gravel, 10YR2/1 inclusions (appear organic)															
FRA-02-05	few vf pores lined with 5YR4/4 , lenses of 10YR 2/1, few masses of 5Y8/2 effervescent, few snail shell fragments															
FRA-02-06	few vf pores lined with 5YR4/4/ I pores lneses of 10YR2/1 and 10YR3/2(appear organic)															
FRA-02-07	evidence of bedding lenses of 1-2 cm sand and fine gravel															
FRA-02-08	evidence of bedding lenses of 1-2 cm sand and fine gravel															

Core Identification	FRA-03							Weather				sunny and warm				
Core Location	106.7 m north & 39.6 m west of the sough east corner of sec. 35, T. 92 N.,							% slope				0-2				
Collection Date	6/15/2001							Vegetation/Cropping Systems				bean (corn) rotation				
Diameter (cm)	4.15							Described by				B. Larabee				
Length (cm)	101							DescriptionDate								
County	Franklin							Classification				Terric Haplosaprsit				
									Sturcture					% Total		
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH
FRA-03-01	01-1003	Oap	4.15	15.00	10YR2/1	<1	fr	1	2	f	gr	M	C	16.1	NE	5.47
FRA-03-02	01-1004	Oa	4.15	31.50	10YR2/1	<1	fr	<1	1 bk. 2	VN bk. F	PL bk. Gr	M	C	14.9	NE	5.39
FRA-03-03	01-1005	2A	4.15	535.00	10YR2/1	0	fi	<1	1 bk. 2	VN bk. F	PL bk. Gr	M	A	3.3	NE	6.87
FRA-03-04	01-1006	2Ag	4.15	58.00	10YR2/1 5Y5/2	0	fr	<1	2 & none	f & none	gr & sg	SL	A	2.3	VS	7.40
FRA-03-05	01-1007	2A2g	4.15	65.00	10YR3/1 & 5Y4/1	0	fr	0	1 & none	none & none	m & sg	L	C	2.7	VE	7.74
FRA-03-06	01-1008	2Cg	4.15	80.50	10YR4/4 &2.5Y5/2	0	fr	0	none	none	m	SL	C	1.6	ST	7.78
FRA-03-07	01-1009	2C2g	4.15	93.50	2.5Y4/2	0	fr	0	none & 1	none & f	sg & sbk	LS	C	1.5	ST	7.86
FRA-03-08	01-1010	2C23g	4.15	101.00	2.5Y4/2	0	fr	0	none	none	sg	LS		1.5	ST	7.83
FRA-03-01	fluffy, few sand grains visible on ped surfaces															
FRA-03-02	few crop remnants visible, vf roots, few vf pores															
FRA-03-03	few crop remnants visible, vf roots, few vf pores															
FRA-03-04	mixed organic material and coarse and very coarse sand and fine gravel															
FRA-03-05	no visible pores, very fine layering mostly fine sandy, few leneses of coarse sand															
FRA-03-06	very fine lenses, 2.5Y5/2 redox at divisions, no visible pores mostly fine sand some coarse sand															
FRA-03-07	vf pores, few clay skins and organins in finer areas															
FRA-03-08	unform fine and very fine sand															

Core Identification	HAN-01							Weather				hot, humid sunny				
Core Location	91.4 m north and 722.4 m west of the southeast corner of sec. 26. T.97N.,							% slope				0-1				
Collection Date	1/4/1900							Vegetation/Cropping Systems				Corn/Bean Rotation				
Diameter (cm)	4.22							Described by				Beth Larabee				
Length (cm)	123.0							DescriptionDate				7/2/2002				
County	Hancock							Classification				Terric Haplosaprist				
									Sturcture					% Total		
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH
HAN-01-01	01-1039	Oa	4.22	32.50	10YR2/1	2	fr	<1	2	f	gr	M	A	27.8	NE	5.65
HAN-01-02	01-1040	2A	4.22	55.50	10YR3/1	<1	fr	<1	2	f	gr	M	C	6.7	NE	5.94
HAN-01-03	01-1041	2A2	4.22	71.00	2.5Y2.5/1 & 2.5Y3/1	0	fr	0	1	f	sbk	MSICL	C	4.5	NE	6.82
HAN-01-04	01-1042	2AB	4.22	86.50	2.5Y2.5/1 2.5Y3/2	0	fr	0	1	f	sbk	SICL	G	1.7	NE	7.52
HAN-01-05	01-1043	2Bwg	4.22	104.50	2.5Y3/1 2.5Y4/1 2.5Y4/2	0	fr	<1	1 bk. 1	none & f	m bk. sbk	SICL	G	1.4	NE	7.51
HAN-01-06	01-1044	2BCg	4.22	117.00	2.5Y4/2 &2.5Y5/2	0	fr	<1	1	none	sbk	SICL	C	2.2	NE	7.52
HAN-01-07	01-1045	2Cg	4.22	123.00	5Y4/2	0	fr	0	1	none	m	SICL		2.1	NE	7.52
HAN-01-01	vf roots, no visible pores, few sand grains on ped surfaces															
HAN-01-02	very few vf pores lined with 2.5YR4/8, 1-2 cm silt lenses 2.5Y6/4															
HAN-01-03	no visible roots, vf pores lined with 2.5Y4/8 very small inclusion s of silt 2.5Y6/4															
HAN-01-04	no visible roots, few vf pores lined with 2.5Y3/6, veins of 2.5Y3/1 mixed with areas of 2.5Y4/1, 2.5Y4/2															
HAN-01-05	few f and vf pores lined with 2.5Y4/8 few plant roots-woody, redox concentrations 2.5Y5/3,															
HAN-01-06	few vf pores lined with 2.5Y4/3 vertical crack organinic coating 10YR2/1, plant root remnants-woody															
HAN-01-07	1 cm fine sand lense 5Y4/2 in color															

Core Identification	HAN-02							Weather				hot, humid sunny				
Core Location	91.4 m north and 722.4 m west of the southeast corner of sec. 26. T.97N.,							% slope				0-1				
Collection Date	1/4/1900							Vegetation/Cropping Systems				Corn/Bean Rotation				
Diameter (cm)	4.3							Described by				Beth Larabee				
Length (cm)	122.5							DescriptionDate				7/2/2002				
County	Hancock							Classification				Terric Haplosaprist				
									Sturcture					% Total		
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH
HAN-02-01	01-1046	Oa	4.3	29.50	10YR2/1	<1	fr	<1	2	f	gr	M	C	25.2	NE	5.68
HAN-02-02	01-1047	Oa2	4.3	52.50	10YR2/1	<1	fr	<1	2	f	gr	M	C	9.6	NE	5.86
HAN-02-03	01-1048	2A	4.3	75.50	10YR2/1 5Y4/5 5Y4/2	0	fr	<1	1	f	sbk	SICL	G	1.8	NE	7.24
HAN-02-04	01-1049	2AB	4.3	98.50	5Y4/2 2.5Y4/3 2.5Y4/4	0	fr	0	1 bk. 1	none bk. F	m bk. Sbk	SICL	C	1.6	NE	7.55
HAN-02-05	01-1050	2Bwg	4.3	109.00	10YR2/1 5Y4/3 5Y3/2 2.5Y4/3	0	fr	0	none	none	m	SICL	A	2.1	NE	7.63
HAN-02-06	01-1051	2Cg	4.3	116.00	5Y5/1	0	fr	0	none	none	m	SICL	A	2.1	VS	7.61
HAN-02-07	01-1052	2Cg2	4.3	122.50	5Y5/1	0	fr	0	none & none	none & none	m & sg	SICL	A	1.6	ST	7.15
HAN-02-01	vf roots, no visible pores no crop remnants, sand grains visible on ped surfaces															
HAN-02-02	few vf pores lined with 2.5Y4/8, 2cm silt lense 2.5Y4/6															
HAN-02-03	no visible roots, few vf pores lined with 2.5Y4/8, small areas of 2.5Y4/8 and 2.5Y4/2															
HAN-02-04	few f & vf pores lined with 2.5Y3/6, small areas of 2.5Y4/1 and 2.5Y4/2															
HAN-02-05	few f & vf pores lined with 2.5Y4/8, redox concentration near pores of 10YR4/4,															
HAN-02-06	few f &vf pores 2.5Y4/3															
HAN-02-07	no pores, few redox features 2.5Y4/4, 1 sand lense 5Y4/2 in color															

Core Identification	HAN-03							Weather				hot, humid sunny				
Core Location	91.4 m north and 722.4 m west of the southeast corner of sec. 26. T.97N.,							% slope				0-1				
Collection Date	1/4/1900							Vegetation/Cropping Systems				Corn/Bean Rotation				
Diameter (cm)	4.16							Described by				Beth Larabee				
Length (cm)	150.0							DescriptionDate				7/3/2002				
County	Hancock							Classification				Terric Haplosaprist				
									Sturcture					% Total		
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH
HAN-03-01	01-1053	Oa	4.16	19.50	10YR2/1	<1	fr	<1	2	f	gr	M	C	26.5	NE	5.77
HAN-03-02	01-1054	Oa2	4.16	34.00	10YT2/1	<1	fr	<1	2	f	gr	M	C	27.0	NE	5.33
HAN-03-03	01-1055	Oa3	4.16	49.00	10YR3/1	0	fr	0	2	f	fr	M	G	14.0	NE	5.61
HAN-03-04	01-1056	A	4.16	66.50	10YR3/1 10YR3/3	0	fr	0	1	none	m	SICL	A	3.1	NE	7.15
HAN-03-05	01-1057	Cg	4.16	150.00	2.5Y5/1	0	fr	0	none	none	sgr	FS		0.7	SL	7.51
HAN-03-01	no visible pores, few vf roots, sand grains visible on ped surfaces															
HAN-03-02	no visible pores, few vf roots, sand grains visible on ped surfaces															
HAN-03-03	no visible pores, no visible roots, few plant remnants															
HAN-03-04	small areas of 2.5Y4/2 and 5Y4/2															
HAN-03-05	uniform fine snad some redox concentration of 2.5Y4/4, common (0.5 cm) silt lenses of 2.5Y4/1 and organic lenses 10YR2/1															

HAR-01							Weather				warm and sunny				
152.4 m east ahd 51.8 m south of the northwest corner of sec. 22, T.89., R.22W.							% slope				0-2				
6/11/2001							Vegetation/Cropping Systems				corn/bean rotation				
3.8							Described by				Beth Larabee				
115.0							DescriptionDate				6/19/2002				
Hardin							Classification				Terric Haplosaprist				
			Max.	Moist	%		%	Sturcture					% Total	Effervescen	
Sample	Horizon	Dia.	Depth	Matrix	Fiber	Consistance	Roots	Grade	Size	Shape	Texture	Boundary	Carbon	ce	pH
01-1011	Oap	3.80	13.5	10YR2/1	<1	fr	1	2	f	gr	M	C	21.8	NE	5.71
10-1012	Oa	3.80	44.5	10YR2/1	0	fr	<1	1 bk. 2	VN bk. F	pl bk. gr	M	A	19.2	NE	5.53
01-1013	2A	3.80	53.0	10YR3/1	0	fr	0	2	f	gr	MSIL	A	3.7	SL	7.35
01-1014	2ABg	3.80	69.5	10YR3/1 5Y5/1	0	fr	0	1	f	sbk	SIL	A	3.4	ST	7.64
01-1015	2Bw	3.80	87.0	10YR5/6 5Y4/4	0	fr	0	2	f	sbk	SIL	C	3.3	ST	7.70
01-1016	2Bg	3.80	97.0	10YR5/8 5Y5/1	0	fr	0	2	f & m	sbk	SIL	C	3.6	SL	7.73
01-1017	2Cg	3.80	115.0	5Y5/1 5YR5/8 2.5Y6/3	0	fr	0	none	none	sg	SL		2.5	ST	7.75
crop remnants, vf roots, few vf pores															
few plant remnants 7.5YR3/4 in color, few vf pores															
few plant remnants 7.5YR3/4, common vf pores, evidence of fine layering															
common vf pores lined with 7.5Y3/4, <0.5cm lenses of 5Y5/1 ST effervescence															
few f & vf pores lined with 7.5YR3/4, 50% oxidized, dark purple coatings lining some pores <0.5cm lenses of 10YR8/6 ST effervescence few organins and clay skins,															
f & vf pores lined with 7.5 YR3/4, evidence of fine layering, common clay skins and organins															
few f & vf pres few lined with 7.5YR3/4, highly oxidized															

Core Identification	HAR-02							Weather				warm and sunny				
Core Location	152.4 m east ahd 51.8 m south of the northwest corner of sec. 22, T.89., R.22W.							% slope				0-2				
Collection Date	6/11/2001							Vegetation/Cropping Systems				corn/bean rotation				
Diameter (cm)	3.83							Described by				Beth Larabee				
Length (cm)	106.0							DescriptionDate				6/19/2002				
County	Hardin							Classification				Terric Haplosaprist				
					Max.	Moist	%		%	Sturcture					% Total	Effervescen	
ID Number	Sample	Horizon	Dia.	Depth	Matrix	Fiber	Consistance	Roots	Grade	Size	Shape	Texture	Boundary	Carbon	ce	pH
HAR-02-01	01-1018	Oap	3.83	14.0	10YR2/1	<1	fr	<1	2	f	gr	M	C	21.6	NE	5.50
HAR-02-02	01-1019	Oa	3.83	41.0	10YR2/1	<1	fr	<1	1 bk. 2	TN bk. F	PL bk. Gr	M	A	20	NE	5.93
HAR-02-03	01-1020	2A	3.83	47.5	10YR3/1	0	fr	0	1	f	gr	MSIL	A	5.5	VS	7.18
HAR-02-04	01-1021	2A2	3.83	52.5	10YR3/1 5Y6/1	0	fr	0	1	f	gr	MSIL	C	3.5	SL	7.40
HAR-02-05	01-1022	2AB	3.83	64.0	10YR3/1 5Y4/2	0	fr	0	2	f	sbk	SIL	A	3.2	SL	7.59
HAR-02-06	01-1023	2Bw	3.83	78.5	5Y4/2	0	fr	0	2	f	sbk	SIL	C	3.4	ST	7.64
HAR-02-07	01-1024	2Bg	3.83	97.5	5Y5/1	0	fr	0	2	m & f	sbk	SIL	C	2.8	ST	7.76
HAR-02-08	01-1025	2Cg	3.83	106.0	5Y5/2	0	fr	0	1	none	m	SIL			ST	7.80
HAR-02-01	crop remnants visible, vf roots, few vf pores															
HAR-02-02	plant remnants 7.5YR4/4, vf roots, few vf pores															
HAR-02-03	plant remnants 7.5YR4/4,few vf pores lined with 7.5YR3/4															
HAR-02-04	few vf pores, flecks of 5Y6/1															
HAR-02-05	common f & vf pores lined with 5Y4/2, , redox features 7.5YR3/4 c,c,p															
HAR-02-06	common f & vf pres lined with 5Y4/2, fleck of 5Y8/1 very effervescent, oxidized areas of 2.4YR5/4 c,vc,p few clay skins and organins															
HAR-02-07	common f & vf pores, smalll flecks 5Y8/1 very effervescent, redox features (5%) 5YR4/6 c&vc, p															
HAR-02-08	rare, vf pores lined with 10YR4/4, evidence of fine layering, sand lenses															

Core Identification	HAR-03							Weather				warm and sunny				
Core Location	152.4 m east ahd 51.8 m south of the northwest corner of sec. 22, T.89., R.22W.							% slope				0-2				
Collection Date	6/11/2001							Vegetation/Cropping Systems				corn/bean rotation				
Diameter (cm)	6.62							Described by				Beth Larabee				
Length (cm)	127.0							DescriptionDate				6/19/2002				
County	Hardin							Classification				Terric Haplosaprist				
									Sturcture							
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	% Total Carbon	Effervescence	pH
HAR-03-01	01-1026	Oap	6.62	15.0	10YR2/1	<1	fr	1	2	f	gr	M	C	22	NE	5.35
HAR-03-02	01-1027	Oa	6.62	49.0	10YR2/1	<1	fr	<1	1 bk. 2	TN bk. f	PL bk. Gr	M	C	18	NE	5.55
HAR-03-03	01-1028	2A	6.62	56.0	10YR3/1	0	fr	0	1	f	gr	MSIL	A	4.9	VS	7.19
HAR-03-04	01-1029	2ABg	6.62	76.5	5Y5/1 5Y3/1	0	fr	0	2	f	sbk	MSIL	A	3.2	SL	7.62
HAR-03-05	01-1030	2Bg	6.62	104.5	5Y4/2 5Y5/2	0	fr	0	2	f	sbk	SIL	C	3.7	ST	7.76
HAR-03-06	01-1031	2B2g	6.62	116.5	5Y5/1 5Y3/1	0	fr	0	2	f	sbk	SIL	C	2.8	SL	7.81
HAR-03-07	01-1032	2Cg	6.62	127.0	10YR4/6 5Y4/2	0	fi	0	1 bk. 2	none bk. f	m bk.sbk	SL		2.5	ST	7.82
HAR-03-01	crop remnants visible,															
HAR-03-02	plant remnant, 10YR3/4, few vf pores,															
HAR-03-03	plant remnants 10YR3/4, common f & vf pores, small flecks of 5Y6/1 strongly effervescent															
HAR-03-04	common f &vf pores lined with 7.5YR4/6, common organins and few clay skins															
HAR-03-05	common f & vf pores lined with 7.5YR4/6, flecks of 5Y6/1 strongly effervescent, common organins and clay skins, oxidation mottles 7% 7.5Y4/6 in color															
HAR-03-06	common f & vf pores lined with 7.5YR4/6, flecks of 5Y6/1 stronly effervescent, common organins and clay skins, oxidation mottles 15% 7.5Y4/6 in color															
HAR-03-07	common f & vf pores, very oxidized 40% 10YR4/6															

Core Identification	HUM-01							Weather				warm and sunny				
Core Location	762 m north and 91.4 m west of the southeast corner of sec. 14, T.92N., R.27W.							% slope				0-1				
Collection Date	6/21/2001							Vegetation/Cropping Systems				corn/bean rotation				
Diameter (cm)	3.95							Described by				B. Larabee				
Length (cm)	97.0							DescriptionDate				10/7/2002				
County	Humboldt							Classification				Terric Haplosaprist				
									Sturcture							
ID Number	Sample	Horizon	Diameter	Maximum Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	% Total Carbon	Effervescence	pH
HUM-01-01	01-1260	Oap	3.95	6.00	10YR2/1	0	fr	0	1	f	gr	M	A	12.00	NE	6.51
HUM-01-02	01-1261	Oa2	3.95	36.50	10YR2/1	0	fr	<1	1 bk. 2	VN bk. F	PL bk. gr	M	C	15.00	NE	6.49
HUM-01-03	01-1262	Oa3	3.95	46.50	10YR2/1	0	fr	<1	1	f &vf	gr	M	C	14.90	NE	5.98
HUM-01-04	01-1263	Oa4	3.95	66.00	10YR2/1	0	fr	0	1 bk. 2	VN bk. F	PL bk. gr	M	G	10.00	NE	6.23
HUM-01-05	01-1264	2A	3.95	86.00	10YR2/1	0	fr	0	1	none	m	MSIL	C	6.90	NE	6.38
HUM-01-06	01-1265	2A2	3.95	97.00	10YR3/1	0	fr	0	1	none	m	MSIL		3.60	NE	6.70
HUM-01-01	crop remnants visible, few sand grains visible on ped surfaces															
HUM-01-02	few sand grains visible on ped surfaces, vf roots, few vf pores															
HUM-01-03	vf roots, few vf pores															
HUM-01-04	few vf pores, few sand grains visible on ped surfaces															
HUM-01-05	common f & vf pores few lined with 10YR3/4															
HUM-01-06	common f & vf pores lined with 10YR3/4, <1mm silty lense 2.5Y6/6															

Core Identification	HUM-02							Weather				warm and sunny				
Core Location	762 m north and 91.4 m west of the southeast corner of sec. 14, T.92N., R.27W.							% slope				0-1				
Collection Date	6/21/2001							Vegetation/Cropping Systems				corn/bean rotation				
Diameter (cm)	3.83							Described by				B. Larabee				
Length (cm)	117.0							DescriptionDate				10/3/2002				
County	Humboldt							Classification				Terric Haplosaprist				
									Sturcture							
ID Number	Sample	Horizon	Diameter	Maximum Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	% Total Carbon	Effervescence	pH
HUM-02-01	01-1216	Oap	3.83	36.00	10YR3/1	0	fr	0	1 bk. 2	VN bk f	pl bk. Gr	M	G	12.20	NE	6.44
HUM-02-02	01-1217	Oa2	3.83	70.00	10YR2/1	0	fr	0	1 bk. 1	none bk. F	m bk. Gr	M	G	10.90	NE	6.74
HUM-02-03	01-1218	Oa3	3.83	96.00	10YR2/1	0	fr	0	1	none	m	M	C	10.26	NE	7.29
HUM-02-04	01-1219	2A	3.83	117.00	10YR2/1	0	fr	0	1 & 2	f	abk	MSIL		3.10	NE	6.60
HUM-02-01	common f & vf pores, few sand grains visible on ped surfaces															
HUM-02-02	very sticky, gel like															
HUM-02-03	marked organins along verticle cracks, common f & vf pores,															
HUM-02-04	sand grains visible on ped surfaces, common f & vf pores lined with 10YR3/4															

Core Identification	HUM-03							Weather				warm and sunny				
Core Location	762 m north and 91.4 m west of the southeast corner of sec. 14, T.92N., R.27W.							% slope				0-1				
Collection Date	6/21/2001							Vegetation/Cropping Systems				corn/bean rotation				
Diameter (cm)	3.82							Described by				B. Larabee				
Length (cm)	119.0							DescriptionDate				10/3/2002				
County	Humboldt							Classification				Terric Haplosaprist				
									Sturcture							
ID Number	Sample	Horizon	Diameter	Maximum Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	% Total Carbon	Effervescence	pH
HUM-03-01	01-1224	Oap	3.82	25.50	10YR/2/1	0	fr	<1	2	f & vf	gr	M	C	14.40	NE	6.46
HUM-03-02	01-1225	Oa2	3.82	49.00	10YR3/1	0	fr	0	2	vf	gr	M	C	11.36	NE	6.10
HUM-03-03	01-1226	Oa3	3.82	72.00	10YR2/2	0	fr	0	2	m & f	gr	M	G	10.26	NE	6.16
HUM-03-04	01-1227	2A	3.82	90.50	10YR2/1	0	fr		1	VN & none	PL bk. None	MSIL	G	5.90	NE	6.48
HUM-03-05	01-1228	2AB	3.82	119.00	10YR2/1	0	fr	0	1	f	sbk	MSIL		4.10	NE	7.02
HUM-03-01	crop remnants, sand grains visible on ped surfaces, vf roots, no visible pores															
HUM-03-02	plant remnants (last years soy bean) sand grains visible on ped surfaces															
HUM-03-03	few vf pores, sand grains visible on ped surfaces															
HUM-03-04	few vf pores, slicken sides, organans															
HUM-03-05	common vf pores lined with 10YR3/6, small silty inclusions of 2.5Y5/4															

Core Identification	KOS-01							Weather				warm and sunny				
Core Location	713. 2 m east and 15.2 meters south of the north west corner sec. 12, T. 100 N., R.29 W.							% slope				0-2				
Collection Date	6/27/2001							Vegetation/Cropping Systems				corn & bean rotation				
Diameter (cm)	3.86							Described by				B. Larabee				
Length (cm)	120.5							DescriptionDate				8/21/2001				
County	Kossuth							Classification				Typic Calciaquoll				
									Sturcture							
ID Number	Sample	Horizon	Diameter	Maximum Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	% Total Carbon	Effervescence	pH
KOS-01-01	01-0977	Oap	3.86	19.00	10YR2/1	1	vfr	2	1	f	gr	M	G	15.7	NE	6.11
KOS-01-02	01-0978	Oa	3.86	35.00	10YR2/1	<1	fr	<1	1 & 1	VN & f	pl bk. sbk	M	G	8.9	NE	6.20
KOS-01-03	01-0979	2A	3.86	54.50	10YR2/1	0	fi	0	1	none	m	SIL	C	3.5	SL	6.99
KOS-01-04	01-0980	2A2	3.86	67.50	2.5YR3/1	0	fi	0	none	none	m	SIL	G	3.2	ST	7.61
KOS-01-05	01-0981	2Cg	3.86	85.00	2.5Y4/1 5Y4/3	0	fr	0	none	none	m	SIL	C	3.6	ST	7.71
KOS-01-06	01-0982	2C	3.86	98.00	2.5Y3/1 5Y3/2	0	fr	0	none	none	m	SIL	C	3.4	ST	7.74
KOS-01-07	01-0983	2C2g	3.86	109.50	2.5Y5/2	0	fr	0	none	none	m	SIL	A	6	ST	7.77
KOS-01-08	01-0984	2C3g	3.86	120.50	10Y5/6 10Y5/2	0	fr	0	none	none	m	SI		1.9	SL	7.64
KOS-01-01	f &vf roots															
KOS-01-02	f & vf roots, few vf pores and channels															
KOS-01-03	common f & vf pores, few lined with 2.5Y3/4															
KOS-01-04	common f & vf pores and channels, many snail shells and few whole snail shells															
KOS-01-05	few <0.5cm silt lenses 2.5Y4/4 in color, many snail shells and few whole snail shells															
KOS-01-06	few <0.5cm silt lenses 2.5Y4/4 in color, many snail shells and few whole snail shells															
KOS-01-07	common <0.5 cm silt lenses 10YR5/6 and 2.5Y7/3, one <0.5 cm organic lense 10YR2/1															
KOS-01-08	common <0.5 cm silt lenses 10YR5/6 and 2.5Y7/3															

Core Identification	KOS-02							Weather				warm and sunny				
Core Location	713. 2 m east and 15.2 meters south of the north west corner sec. 12, T. 100 N., R.29 W.							% slope				0-2				
Collection Date	6/27/2001							Vegetation/Cropping Systems				corn & bean rotation				
Diameter (cm)	3.84							Described by				B. Larabee				
Length (cm)	114							DescriptionDate				6/20/2002				
County	Kossuth							Classification				Typic Calciaquoll				
									Sturcture							
ID Number	Sample	Horizon	Diameter	Maximum Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	% Total Carbon	Effervescence	pH
KOS -02-01	01-1033	Oap	3.84	20.00	10YR2/1	<1	fr	2	1	F	gr	M	G	16.6	NE	5.74
KOS -02-02	01-1034	Oa	3.84	37.00	10YR2/1	<1	fr	1	1	VN & F	PL bk gr	M	C	11.7	NE	5.93
KOS -02-03	01-1035	2A	3.84	61.00	10YR2/1	0	fr	<1	none	none	m	SIL	C	3.5	LS	6.97
KOS -02-04	01-1036	2C	3.84	71.00	2.5Y3/2 5Y2.5/1	0	fr	0	none	none	m	SIL	G	2.9	ST	7.51
KOS -02-05	01-1037	2Cg	3.84	84.00	2.5Y3/2 5Y5/1	0	fr	0	none	none	m	SIL	C	2.9	ST	7.61
KOS -02-06	01-1038	2C2g	3.84	114.00	1 2.5Y3/1 5Y4/2	0	fr	0	none	none	m	SIL		3.7	ST	7.66
KOS -02-01	crop remnants visible, f & vf roots															
KOS -02-02	f & vf roots, few vf pores															
KOS -02-03	common vf pores loned with 2.5Y4/3															
KOS -02-04	many f & vf pores, no redox															
KOS -02-05	many f & vf pores, no redox, many snail shell fragments															
KOS -02-06	few vf pores, no redox, many snail shell fragments															

Core Identification	KOS-03							Weather				warm and sunny				
Core Location	713. 2 m east and 15.2 meters south of the north west corner sec. 12, T. 100 N., R.29 W.							% slope				0-2				
Collection Date	6/27/2001							Vegetation/Cropping Systems				corn & bean rotation				
Diameter (cm)	3.81							Described by				B. Larabee				
Length (cm)	97							DescriptionDate				8/16/2001				
County	Kossuth							Classification				Typic Calciaquoll				
									Sturcture					% Total		
ID Number	Sample	Horizon	Diameter	Maximum Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH
KOS-03-01	01-0877	Oap	3.81	18.00	10YR2/1	2	vfr	1	1	F	gr	M	C	16.7	NE	5.74
KOS-03-02	01-0878	Oa	3.81	39.00	10YR2/1	1	fr	<1	1	VN & F	PL & sbk	M	G	10.1	NE	5.86
KOS-03-03	01-0879	2A	3.81	60.00	10YR2/1	0	fi	<1	none	none	m	SIL	C	3.6	NE	6.73
KOS-03-04	01-0880	2A2	3.81	70.50	5Y3/1	0	fi	0	none	none	m	SICL	G	3.9	SL	7.61
KOS-03-05	01-0881	2C	3.81	79.50	2.5Y3/1	0	fi	0	none	none	m	SICL	C	4.2	SL	7.68
KOS-03-06	01-0882	2Cg	3.81	97.00	5Y4/1	0	fi	0	none	none	m	SICL		3.4	ST	7.64
KOS-03-01	f & vf roots															
KOS-03-02	f & vf roots, few vf pores															
KOS-03-03	vf roots,common vf pores and channels lined with 5Y4/6, few tubular f pores															
KOS-03-04	reduced color, few f & vf tubular pores, many snail shell fragments and few whole snail shells															
KOS-03-05	reduced color, common f & vf tubular pores, many snail shell fragments and few whole snail shells															
KOS-03-06	reduced color, few f & vf pores, many snail shell fragments, few fine mottles 5Y4/3															

Core Identification	PAL-01							Weather				warm and sunny				
Core Location	91.4 m west and 12.2 m south of the northeast corner of the northwest 1/4 sec.34, T. 97 N. R.34 W.							% slope				0-1				
Collection Date	6/29/2001							Vegetation/Cropping Systems				soybean corn rotation				
Diameter (cm)	3.78							Described by				B. Larabee				
Length (cm)	126.0							DescriptionDate				8/13/2001				
County	Palo Alto							Classification				Typic Calciaquoll				
				Max.	Moist	%		%	Sturcture					% Total		
ID Number	Sample	Horizon	Dia.	Depth	Matrix	Fiber	Consistance	Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH
PAL-01-01	01-0775	Oa	3.78	23.0	10YR2/1	<1	vfr	2	1 & 1	TN & vf	PL &gr	MSIL	A	15.0	NE	6.57
PAL-01-02	01-0776	2A	3.78	47.0	10YR2/1	0	fr	1	1 & 1	TN & vf	PL & sbk.	SIL	C	5.9	SL	7.35
PAL-01-03	01-0777	2A2	3.78	66.5	10YR2/1	0	fr	<1	1	none	m	SICL	G	3.6	SL	7.33
PAL-01-04	01-0778	2A3	3.78	86.5	10YR2/1	0	fr	<1	1	none	m	SIC	G	2.6	SL	7.48
PAL-01-05	01-0779	2A4	3.78	104.0	10YR2/2 2.5Y4/3	0	fr	0	1	none	m	SIC	G	2.8	SL	7.68
PAL-01-06	01-0780	2ACk	3.78	111.0	7.5YR3/2 2.5Y4/3	0	fr	0	1	none	m	SIC	A	3.4	ST	7.74
PAL-01-07	01-0781	2Ckg	3.78	116.0	5YR4/2 2.5Y5/2	0	fi	0	2	none	m	SIL	VA	4.0	ST	7.80
PAL-01-08	01-0782	2Ck	3.78	122.0	10YR5/6 2.5YR2.5/2	0	fr	0	1 & 1	none & f	m & sbk	SIL	VA	3.3	ST	7.55
PAL-01-09	01-0783	2Ck2	3.78	126.0	2.5Y5/3	0	fr	0	1 & 1	none & f	m & sbk	SICL		3.0	ST	7.54
PAL-01-01	crop remnants present, vf roots, vf pores, few 7.5YR4/6 plant remnants,															
PAL-01-02	f & vf roots, vf pores, few 7.5YR4/6 plant remnants,															
PAL-01-03	vf roots, few f & vf pores lined with 5YR4/4, silt lenses 2.5Y6.6, rare snail shell fragments															
PAL-01-04	common f & vf pores lined with 5YR4/4, few fine prominent mottles 5YR4/4, few snail shell fragments															
PAL-01-05	common fine promenent mottles 2.5Y3/6, common snail shell fragments															
PAL-01-06	few fine prominent mottles 2.5Y4/8, many snail shell fragments															
PAL-01-07	few fine snail shell fragments															
PAL-01-08	few silty lenses, few fine snail shell fragments															
PAL-01-09	few fine promenant 2.5YR5/6, rare snail shell fragment															

Core Identification	PAL-02							Weather				warm and sunny				
Core Location	91.4 m west and 12.2 m south of the northeast corner of the northwest 1/4 sec.34, T. 97 N. R.34 W.							% slope				0-1				
Collection Date	6/29/2001							Vegetation/Cropping Systems				soybean corn rotation				
Diameter (cm)	3.79							Described by				B. Larabee				
Length (cm)	124.0							DescriptionDate				8/13/2001				
County	Palo Alto							Classification				Typic Calciaquoll				
				Max.	Moist	%		%	Sturcture					% Total		
ID Number	Sample	Horizon	Dia.	Depth	Matrix	Fiber	Consistance	Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH
PAL-02-01	01-0784	Oa	3.79	19.5	10YR2/1	<1	vfr	1	1	f	gr	MSI	C	16.4	NE	6.15
PAL-02-02	01-0785	Oa2	3.79	38.5	10YR2/1	0	vfr	1	1&1	VN&f	PL &sbk	MSI	C	10.7	NE	6.73
PAL-02-03	01-0786	2A	3.79	53.5	10YR2/1	0	fr	<1	1&1	VN&f	PL &sbk	MSIL	C	2.6	SL	6.95
PAL-02-04	01-0787	2A2	3.79	63.0	10YR2/1	<1	fr	0	1	none	m	SICL	G	3.6	VS	7.10
PAL-02-05	01-0788	2Ak	3.79	92.5	10YR3/1	0	fr	0	1	none	m	SIC	C	2.5	VS	7.42
PAL-02-06	01-0789	2Ckg	3.79	103.0	10YR3/1 2.5Y4/2	0	fr	0	1	none	m	SIL	A	6.5	ST	7.71
PAL-02-07	01-0790	2Ckg2	3.79	116.0	2.5y4/2	0	fi	0	1	none	m	SIL	A	7.0	SL	7.62
PAL-02-08	01-0791	2C	3.79	124.0	2.5y4/3	0	fi	0	1	none	m	SIL		1.9	SL	7.59
PAL-02-01	f & vf roots, few plant remnants 7.5YR4/6															
PAL-02-02	f & vf roots, few plant remnants 7.5YR4/6															
PAL-02-03	f & vf roots, few plant remnants 7.5YR4/6, silty lenses 10YR5/4															
PAL-02-04	few f & vf pores lined with 7.5YR4/6															
PAL-02-05	few m & f pores lined with 7/5YR4/6, frequent snail shell fragments															
PAL-02-06	few f pores lined with 7.5YR4/6, organic lenses 10YR2/1, frequent snail shell fragments															
PAL-02-07	organic lenses 10YR2/1, many snail shells and shell fragments															
PAL-02-08	very few vf pores lined with 10YR5/8															

Core Identification	PAL-03							Weather				warm and sunny				
Core Location	91.4 m west and 12.2 m south of the northeast corner of the northwest 1/4 sec.34, T. 97 N. R.34 W.							% slope				0-1				
Collection Date	6/29/2001							Vegetation/Cropping Systems				soybean corn rotation				
Diameter (cm)	3.84							Described by				B. Larabee				
Length (cm)	125							DescriptionDate				8/9/2001				
County	Palo Alto							Classification				Typic Calciaquoll				
								%	Sturcture					% Total		
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH
PAL-03-01	01-0792	Oa	3.84	15.0	10YR2/1	<1	vfr	1	1	f	gr	MSI	G	17.4	NE	5.93
PAL-03-02	01-0793	Oa2	3.84	32.5	10YR2/1	0	fr	1	1&1	VN & f	PL & sbk	M	A	14.5	NE	6.39
PAL-03-03	01-0794	2A	3.84	43.0	10YR2/1	<1	fr	0	1&1	VN & f	PL & sbk	MSI	C	7.0	ST	7.13
PAL-03-04	01-0795	2A2	3.84	59.5	10YR2/1	0	fr	1	1&1	VN & f	PL & sbk	SIL	C	5.0	SL	7.05
PAL-03-05	01-0796	2A3	3.84	87.5	10YR2/1	0	fr	0	1	none	m	SIC	G	2.9	SL	7.24
PAL-03-06	01-0797	2Ak	3.84	98.0	10YR3/1	0	fr	0	1	none	m	SIC	A	2.4	SL	7.56
PAL-03-07	01-0798	2ACkg	3.84	106.0	2.5Y3/2 2.5Y5/3	0	fr	0	1	none	m	SIC	A	2.3	ST	7.70
PAL-03-08	01-0799	2Ckg	3.84	115.5	10YR6/2 2.5YR4/4	0	fr	0	1	none	m	SIL	A	4.3	ST	7.78
PAL-03-09	01-0800	2Ckg	3.84	119.0	10YR21 10YR6/2 10YR5/4	0	fr	0	1	none	m	CL	A	6.9	ST	7.70
PAL-03-10	01-0801	2C	3.84	125.0	2.5Y6/3	0	fi	0	2	none	m	SICL		2.8	ST	7.68
PAL-03-01	vf roots, few 7.5YR4/6 plant remnants															
PAL-03-02	vf roots, few 7.5YR4/6 plant remnants															
PAL-03-03	few 7.5YR4/6 plant remnants, very small silt lenses 2.5Y7/1															
PAL-03-04	vf roots, rare silt lenses 2.5Y7/1															
PAL-03-05	common promenant mottles 5YR4/6, few snail shell fragments															
PAL-03-06	few promenant mottles 5YR4/6, common snail shell fragments															
PAL-03-07	common snail shell fragments															
PAL-03-08	many snail shell fragments															
PAL-03-09	many snail shell fragments, fine organic lenses 10YR2/1,															
PAL-03-10	silt lenses 2.5Y8/3 extremely finely bedded															

Core Identification	POL-01							Weather				hot and dry				
Core Location	475. 5 m south and 83.8 m east of the northwest corner sec. 29,							% slope				0-2				
Collection Date	6/21/2001							Vegetation/Cropping Systems				corn and beans (was in crp)				
Diameter (cm)	4.24							Described by				B. Larabee				
Length (cm)	117.0							DescriptionDate				5/22/2002				
County	Polk							Classification				Typic Calciaquoll				
				Max.	Moist	%		%	Sturcture					% Total		
ID Number	Sample	Horizon	Dia.	Depth	Matrix	Fiber	Consistance	Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH
POL-01-01	01-0896	Oa	4.24	32.5	10YR2/1	<1	fr	1	2	f & vf	gr	M	G	11.5	NE	6.27
POL-01-02	01-0987	Oa2	4.24	64.5	10YR2/1	<1	fr	<1	1 bk. 2	VN bk. f &vf	PL bk gr	M	C	9.6	NE	6.65
POL-01-03	01-0898	2A	4.24	77.5	10YR3/1	0	fr	0	1	f & vf	gr	MSICL	C	2.5	NE	6.99
POL-01-04	01-0899	2ABg	4.24	87.0	10YR3/1 2.5YR6/2	0	fr	0	1	f	sbk	SICL	A	2.6	VS	7.64
POL-01-05	01-0900	2Bwg	4.24	109.0	2.5YR6/2 2.5YR4/3	0	fr	0	2	f	sbk	SICL	C	3.4	SL	7.83
POL-01-06	01-0901	2Bwg2	4.24	117.0	2.5Y5/2 2.5Y5/3	0	fr	0	2	f	sbk	SICL		2.8	SL	7.79
POL-01-01	none															
POL-01-02	common m & f pores lined with 7.5YR 3/3, 1 cm lense 2.5Y6/3															
POL-01-03	common f & vf pores lined with 2.5YR4/6, <1cm silt lenses 5Y5/2															
POL-01-04	common f & vf pores lined with 2.5YR3/4, common snail shell fragments															
POL-01-05	many f & vf pores lined with 2.5YR3/6, small lenses of organic material 10YR3/1, few clay skins, few organins, common snail shells															
POL-01-06	few f & vf pores lined wth 2.5YR3/6, common clay skinss and few organinsrare snail shells															

Core Identification	POL-02							Weather				hot and dry				
Core Location	475. 5 m south and 83.8 m east of the northwest corner sec. 29,							% slope				0-2				
Collection Date	6/21/2001							Vegetation/Cropping Systems				corn and beans (was in crp)				
Diameter (cm)	3.84							Described by				B. Larabee				
Length (cm)	93.5							Description Date				5/22/2002				
County	Polk							Classification				Typic Calciaquoll				
				Max.	Moist	%		%	Sturcture					% Total		
ID Number	Sample	Horizon	Dia.	Depth	Matrix	Fiber	Consistance	Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH
POL-02-01	01-0902	A	3.84	45.5	10YR2/1	<1	fr	<1	2	vf	gr	MSICL	C	7.7	NE	6.46
POL-02-02	01-0903	A	3.84	57.0	10YR2/1	0	fr	0	1	f	sbk	MSICL	A	2.1	NE	7.08
POIL-02-03	01-0904	AB	3.84	69.5	10YR2/1	0	fr	0	1	m & f	sbk	SICL	A	2.1	VS	7.57
POL-02-04	01-0905	Bt	3.84	84.0	2.5YR3/2 2.5YR 5/3	0	fr	0	1	m & f	sbk	SILC	C	2.9	SL	7.78
POL-02-05	01-0906	Bt2	3.84	93.4	5YR5/3 7.5YR5/8	0	fr	0	1	m & f	sbk	SIC		3.1	SL	7.80
POL-02-01	vf roots, few vf pores, tile fragments, rare snail shell fragment															
POL-02-02	common f & vf pores lined with 2.5YR2.5/3, silt lenses 2.5Y5/4, few clay skins															
POL-02-03	common f & vf pores lined with 2.5YR23/3, silt lenses 2.5Y5/4 & 2.5Y6/1few clay skins few organins, common snail shell fragments															
POL-02-04	few vf pores lined with 2.5YR3/6,common clay skins and organins, common snail shell fragments															
POL-02-05	few vf pores lined with 2.5YR3/6, common clay skins and many organins, few snail shell fragments															

Core Identification	POL-03							Weather				hot and dry				
Core Location	475. 5 m south and 83.8 m east of the northwest corner sec. 29,							% slope				0-2				
Collection Date	6/21/2001							Vegetation/Cropping Systems				corn and beans (was in crp)				
Diameter (cm)	4.15							Described by				B. Larabee				
Length (cm)	114.5							DescriptionDate				5/24/2002				
County	Polk							Classification				Typic Calciaquoll				
				Max.	Moist	%		%	Sturcture					% Total		
ID Number	Sample	Horizon	Dia.	Depth	Matrix	Fiber	Consistance	Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH
POL-04-01	01-0914	Oa	4.15	25.5	10YR2/1	<1	fr	<1	2	f	gr	MSIL	G	9.8	NE	6.17
POL-04-02	01-0915	Oa2	4.15	40.5	10YR2/1	0	fr	0	2	f	gr	MSIL	C	8.3	NE	6.40
POL-04-03	01-0916	2A	4.15	49.0	10YR2/1 2.5Y6/4	0	fr	0	1	none	m	SI	C	1.6	NE	6.84
POL-04-04	01-0917	2A2	4.15	76.0	10YR2/1	0	fr	0	1	none	m	SIL	A	3	NE	7.07
POL-04-05	01-0918	2AB	4.15	83.0	10YR2/2 5Y6/2	0	fr	0	1 bk. 1	none bk. f	m bk. Sbk	SIL	A	2.5	VS	7.68
POL-04-06	01-0919	2Bwg	4.15	90.5	10YR3/1 2.5Y7/1 2.5Y5/2	0	fr	0	2	m & f	sbk	SIL	C	3.5	SL	7.79
POL-04-07	01-0920	2Btg	4.15	107.0	10YR4/4 5Y5/2	0	fr	0	2	m	sbk	SIL	A	3.1	SL	7.76
POL-04-08	01-0921	2BC	4.15	114.5	10YR5/2 2.5YR4/4	0	fr	0	2	m	sbk	SIL		2.9	ST	7.74
POL-04-01	crop remnants, vf roots															
POL-04-02	no pores visible															
POL-04-03	f & vf pores lined with 2.5Y6/4															
POL-04-04	f & vf pores lined with 2.5Y3/4, few snail shell fragments															
POL-04-05	vf pores lined with 2.5Y3/4 common snail shell fragments															
POL-04-06	vf pores lined with 2.5Y3/4, few clay skins, few organins															
POL-04-07	f & vf pores lned with 2.5YR3/4, common clay skins, few organins															
POL-04-08	vf pores lined with 7.5YR4/6, few clay skins															

Core Identification	WIN-01							Weather				warm and windy				
Core Location	755.9 m west and 57.9 m north of the southeast corner of sec.							% slope				0-2				
Collection Date	4/29/2001							Vegetation/Cropping Systems				corn and bean rotation				
Diameter (cm)	3.86							Described by				Beth Larabee				
Length (cm)	123.0							DescriptionDate				4/29/2003				
County	Winnebago							Classification				Terric Haplosaprist				
				Max.	Moist	%		%	Sturcture					% Total		
ID Number	Sample	Horizon	Dia.	Depth	Matrix	Fiber	Consistance	Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH
WIN-01-01	01-1389	Oap	3.86	10.0	10YR2/1	<1	fr	1	2	f & vf	gr	M	A	19.7	NE	6.21
WIN-01-02	01-1390	Oa	3.86	25.0	10YR2/1	<1	fr	<1	2	f	gr	M	C	21.4	NE	6.00
WIN-01-03	01-1391	Oa2	3.86	49.0	10YR3/6	<1	fr	0	2 bk. 1	TN bk.f	PL bk. gr	M	G	23.6	NE	6.07
WIN-01-04	01-1392	2A	3.86	68.5	10YR2/1	0	fr	0	1	vf	sbk	MSIL	C	4.4	NE	6.76
WIN-01-05	01-1393	2Bwg	3.86	88.5	5Y5/2	0	fr	0	1	f	sbk	SIL	C	1.7	VS	7.68
WIN-01-06	01-1394	2Ckg	3.86	107.0	5Y5/2 5Y4/1 5Y4/3	0	fr	0	none	none	sg	LFS	G	1.5	ST	7.85
WIN-01-07	01-1395	2C	3.86	123.0	5Y4/3 5YR3/4	0	fr	0	2	vf	sbk	SIL		2.3	SL	7.85
WIN-01-01	crop remnants visible, vf roots, no visible pores, sand grains visible on ped surfaces															
WIN-01-02	vf roots, no visible pores, sand grains visible on ped surfaces, small areas of 10YR3/6															
WIN-01-03	common vf pores lined with 10YR3/3, sand grains visible on ped surfaces															
WIN-01-04	common vf pores lined with 10YR3/3, sand grains visible on ped surfaces															
WIN-01-05	few vf and common f pores lined with 10YR3/3 and 10YR3/6															
WIN-01-06	few vf & f pores lined with 10YR4/6 common snail shell fragments															
WIN-01-07	15% oxidized mottles 5YR3/4, common clay coating and organins															

Core Identification	WIN-02							Weather				warm and windy				
Core Location	755.9 m west and 57.9 m north of the southeast corner of sec.							% slope				0-2				
Collection Date	4/29/2001							Vegetation/Cropping Systems				corn and bean rotation				
Diameter (cm)	3.86							Described by				Beth Larabee				
Length (cm)	105.0							DescriptionDate				4/29/2003				
County	Winnebago							Classification				Terric Haplosaprist				
				Max.	Moist	%		%	Sturcture					% Total		
ID Number	Sample	Horizon	Dia.	Depth	Matrix	Fiber	Consistance	Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH
WIN-02-01	01-1395	Oap	3.86	10.0	10YR2/1	<1	fr	1	1	m & f	gr	M	A	18.5	NE	6.10
WIN-02-02	01-1396	Oa	3.86	28.0	10YR2/1	<1	fr	<1	2	m	gr	M	G	19.8	NE	6.18
WIN-02-03	01-1397	Oa2	3.86	56.0	10YR2/1	<1	fr	<1	2 bk. 1	TN bk. f	PL bk. Gr	M	C	18.5	NE	6.05
WIN-02-04	01-1398	2Ak	3.86	77.0	10YR2/1 5Y4/2	0	fr	1	1	vf	sbk	MSIL	G	2.5	NE	6.86
WIN-02-05	01-1399	2Bwg	3.86	92.0	10YR2/1 5Y5/2	0	fr	0	1	f	sbk	SIL	C	1.6	SL	7.50
WIN-02-06	01-1400	2C	3.86	105.0	7.5YR4/3 5Y5/2 5Y4/2	0	fr	0	none	none	sg	LFS		1.2	ST	7.70
WIN-02-01	crop remnants visible, vf roots, no visible pores, sand grains visible on ped surfaces															
WIN-02-02	vf roots, no visible pores, sand grains visible on ped surfaces, small areas of 10YR3/6															
WIN-02-03	common vf & few f pores lined with 10YR3/3															
WIN-02-04	common f & vf pores partially lined with 10YR3/3, few chalky masses 5Y8/2 vs effervescent few clay-organin coatings															
WIN-02-05	common vf & few f pores lined with 10YR3/3, common clay coatings, few organins															
WIN-02-06	10% mottles oxidized 5YR3/4, few clay coatings, few organins															

Core Identification	WIN-03							Weather				warm and windy				
Core Location	755.9 m west and 57.9 m north of the southeast corner of sec.							% slope				0-2				
Collection Date	4/29/2001							Vegetation/Cropping Systems				corn and bean rotation				
Diameter (cm)	3.88							Described by				Beth Larabee				
Length (cm)	105.0							DescriptionDate				4/29/2003				
County	Winnebago							Classification				Terric Haplosaprist				
				Max.	Moist	%		%	Sturcture					% Total		
ID Number	Sample	Horizon	Dia.	Depth	Matrix	Fiber	Consistance	Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH
WIN-03-01	01-1401	Oap	3.88	7.0	10YR2/1	<1	fr	<1	1	vf	gr	M	A	20.0	NE	6.17
WIN-03-02	01-1402	Oa	3.88	20.5	10YR2/1	<1	fr		2	f	gr	M	C	20.9	NE	6.04
WIN-03-03	01-1403	Oa2	3.88	45.0	10YR2/1	0	fr	<1	1	f	gr	M	G	16.5	NE	6.07
WIN-03-04	01-1404	2AB	3.88	68.0	10YR2/1 5Y6/3	0	fr	<1	1	f	sbk	MSIL	G	1.6	NE	7.21
WIN-03-05	01-1405	2Bwg	3.88	98.0	10YR2/1 5Y5/2 5Y4/2	0	fr	0	2	f	sbk	SIL	A	1.9	SL	7.75
WIN-03-06	01-1406	2C	3.88	105.0	7.5YR4/6 5Y5/3	0	fr	0	none	none	sg	LSF		2.7	ST	7.72
WIN-03-01	crop remnants visible, no visible pores, sand grains visible on ped surfaces															
WIN-03-02	vf roots, sand grains visible on ped surfaces															
WIN-03-03	vf roots, few vf pores, small areas of 10YR3/6, sand grains visible on ped surfaces															
WIN-03-04	many vf pores lined with 10YR3/3, common clay coatings, common organins															
WIN-03-05	many vf pores lined with 10YR3/3, common clay coatings2% mottles oxidized 10YR3/3															
WIN-03-06	50% mottles, oxidized 5Y3/4															

Core Identification	WOR-01							Weather				warm and windy				
Core Location	442.0 m south and 204.2 m east of the northwest corner sed. 36.							% slope				0-2				
Collection Date	8/14/2001							Vegetation/Cropping Systems				corn and bean rotation				
Diameter (cm)	6.06 and 3.96							Described by				Beth Larabee				
Length (cm)	213.0 (122.0 and 91.0)							DescriptionDate				4/15/2001				
County	Worth							Classification				Terric Haplosaprist				
									Sturcture							
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	% Total Carbon	Effervescence	pH
WOR-02-01	01-1366	Oap	6.06	7.5	10YR2/1	2	fr	5	1	f & vf	gr	M	A	20.8	NE	5.15
WOR-02-02	01-1367	Oa	6.06	36.5	10YR2/1 10YR3/6	1	fr	4	2 bk. 2	TN bk. vf	PL bk. gr	M	A	20.0	NE	4.54
WOR-02-03	01-1368	Oa2	6.06	60.0	10YR2/1 10YR3/6	<1	fr	3	2 bk. 2	TN bk. f	PL bk. gr	M	C	14.5	NE	4.85
WOR-02-04	01-1369	2A	6.06	73.0	10YR2/1 10YR3/4	<1	fr	<1	1 bk. 1	VN bk. f	PL bk. gr	M	G	5.8	NE	5.54
WOR-02-05	01-1370	2A2	6.06	111.5	10YR2/2 7.5R3/6	0	fi	0	1	f	gr	M	C	5.9	NE	6.18
WOR-02-06	01-1371	2A3	6.06	122.0	10YR2/2 10YR3/2	0	fi	0	1	VN	PL	M		3.4	NE	6.24
WOR-02-07	01-1372	2A4	3.96	150.0	10YR2/1 2.5Y5/6 2.5Y4/3	0	fr	0	1	TN	PL	M	A	3.8	NE	5.83
WOR-02-08	01-1373	2A5	3.96	163.0	10YR2/1 2.5Y3/1	0	fr	0	2	TN	PL	M	C	7.3	NE	5.45
WOR-02-09	01-1374	Oib	3.96	175.0	10YR3/2 10YR4/3	2	fr	0	2	TN	PL	M	G	15.6	NE	1.99
WOR-02-10	01-1375	Oib2	3.96	204.5	2.5Y3/1	0	fi	0	2	TN	PL	M	C	11.2	NE	1.87
WOR-02-11	01-1376	2C	3.96	213.0	2.5Y3/2	0	fi	0	1	none	m	MSIL		5.7	NE	4.66
WOR-02-01	initially hydrophobic, crop remnants visible, vf roots, sand grains visible on ped surfaces															
WOR-02-02	initialy hydrophobic, sand lenses, few sand grains visible on ped surfaces															
WOR-02-03	many m pores, sand grains visible on ped surfaces															
WOR-02-04	many f & vf pores, few sand grains visible on ped surfaces															
WOR-02-05	few f & many vf pores, few sand grains visible on ped surfaces, slicken sides, organins															
WOR-02-06	many vf pores lined with 10YR3/6															
WOR-02-07	common vf pores lined with 5YR3/4, 3 cm silt lense .5Y5/6 and 2.5Y4/3															
WOR-02-08	few vf pores lined with 5YR3/2, plant remnants visible leaf patters,															
WOR-02-09	plant remnants leaf patterns clearly visible, sulfur smell															
WOR-02-10	areas of 5/5b lining crack surfaces, organins, outside of core 2.5Y5/4															
WOR-02-11	no pores visible															

Core Identification	WOR-02							Weather				warm and windy				
Core Location	442.0 m south and 204.2 m east of the northwest corner sed. 36.							% slope				0-2				
Collection Date	8/14/2001							Vegetation/Cropping Systems				corn and bean rotation				
Diameter (cm)	6.27 , 3.80							Described by				Beth Larabee				
Length (cm)	188.5 (110.5 and 78.0)							DescriptionDate				Terric Haplosaprist				
County	Worth							Classification								
									Sturcture							
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	% Total Carbon	Effervescence	pH
WOR-03-01	01-1356	Oap	6.27	17.0	10YR2/1	2	fr	4	1	m & f	gr	M	C	21.0	NE	4.92
WOR-03-02	01-1357	Oa	6.27	34.5	10YR2/1	1	fr	2	1	f	gr	M	G	23.5	NE	4.73
WOR-03-03	01-1358	Oa2	6.27	67.0	10YR2/1	<1	fr	1	1 bk. 2	VN bk. f	PL bk. gr	M	C	12.0	NE	5.08
WOR-03-04	01-1359	2A2	6.27	92.5	10YR2/1 10YR2/2	0	fr	0	2 bk. 2	VN bk. f	PL bk. gr	MSIL	A	6.7	NE	5.85
WOR-03-05	01-1360	2A3	6.27	110.5	10YR2/1 5Y2.5/2	0	fr	0	2	f	sbk	MSIL		4.9	NE	6.33
WOR-03-06	01-1414	2A4	3.80	127.5	10YR2/2 2.5Y5/4	0	fr	0	1	f	gr	MSIL	A	2.2	NE	5.74
WOR-03-07	01-1415	2A5	3.80	148.0	10YR2/1 10YR3/2	1	fr	0	2	f	gr	MSIL	G	7.3	NE	5.73
WOR-03-08	01-1416	Oib	3.80	169.0	10YR3/2	2	fr	0	1	VN	gr	M	C	16.9	NE	2.79
WOR-03-09	01-1417	Oib2	3.80	181.5	2.5Y3/2 2.5Y4/2	0	fi	0	1	none	m	M	A	11.3	NE	2.30
WOR-03-10	01-1418	C	3.80	188.5	2.5Y3/2	0	fi	0	1	none	m	MSIL		6.5	NE	2.40
WOR-03-01	vf roots, crop remnants visible															
WOR-03-02	vf roots, crop remnants visible															
WOR-03-03	common vf pores lined with 10YR3/4, sand grains visible on ped surfaces															
WOR-03-04	common f and vf pores lined with 10YR3/4, slicken sides, organins															
WOR-03-05	common vf and few f pores lined with 10YR3/4, 1-2 mm charcoal															
WOR-03-06	few vf pores lined 10YR3/4															
WOR-03-07	few vf pores lined 10YR3/4, slicken sides, organins															
WOR-03-08	no visible pores, plant materials visible, sulfur smell															
WOR-03-09	no visible pores, plant materials visible, sulfur smell, outside of core changed color 2.5Y6/3															
WOR-03-10	no visible pores, plant materials visible, sulfur smell, clear needle crystals <1mm, outside of core changed color 2.5Y6/3															

Core Identification	WOR-03							Weather				warm and windy				
Core Location	442.0 m south and 204.2 m east of the northwest corner sed. 36.							% slope				0-2				
Collection Date	8/14/2001							Vegetation/Cropping Systems				corn and bean rotation				
Diameter (cm)	6.27 and 3.84							Described by				Beth Larabee				
Length (cm)	230.0 (115.0 and 115.0)							DescriptionDate				5/12/2003				
County	Worth							Classification				Terric Haplosaprist				
								%	Sturcture					% Total	Effervescenc	
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	Roots	Grade	Size	Shape	Texture	Boundary	Carbon	e	pH
WOR-05-01	01-1361	Oap	6.27	10.0	10YR2/1	2	fr	5	1	vf	gr	M	C	20.7	NE	5.16
WOR-05-02	01-1362	Oa	6.27	26.5	10YR2/1	1	fr	2	2	f & vf	gr	M	C	21.0	NE	4.49
WOR-05-03	01-1363	Oa2	6.27	64.0	10YR2/1 10YR3/4	<1	fr	2	1bk. 1	VN bk. f	PL bk. gr	M	G	18.1	NE	4.68
WOR-05-04	01-1364	2A	6.27	92.0	10YR2/1 10YR2/2	0	fr	0	2 bk. 2	VN bk. f	PL bk. gr	MSIL	G	7.1	NE	5.51
WOR-05-05	01-1365	2A2	6.27	115.0	10YR2/1 5Y2.5/2	0	fr	0	1 bk. 2	VN bk. f	PL bk. gr	MSIL		5.3	NE	6.21
WOR-05-06	01-1419	Oab	3.84	119.0	10YR2/1	0	fr	0	1	f & vf	gr	M	A	19.8	NE	4.63
WOR-05-07	01-1420	2Ab	3.84	152.0	10YR2/2	1	fr	0	1 bk 1	TN bk. vf	PL bk. sbk	MSIL	G	5.2	NE	6.02
WOR-05-08	01-1421	Oib	3.84	168.0	10YR2/2 7.5YR2.5 /2	2	fr	0	1	TN	PL	M	G	15.3	NE	4.36
WOR-05-09	01-1422	Oib2	3.84	200.0	2.5Y3/1	0	fi	0	1&1	none & VN	m & PL	M	G	11.7	NE	2.28
WOR-05-10	01-1423	2Ab'	3.84	218.5	2.5Y3/1 5Y3/1	0	fi	0	1	f & vf	sbk	MSIL	C	3.4	NE	3.56
WOR-05-11	01-1424	2C	3.84	230.0	2.5Y3/1	0	fi	0	1	f & vf	sbk	MSIL		2.9	NE	6.62
WOR-05-01	many crop remnants, vf roots															
WOR-05-02	vf roots, few crop remnants,															
WOR-05-03	many vf pores, sand grains visible on ped surfaces															
WOR-05-04	common vf pores lined with 10YR 3/4, slicken sides on cracks, organins															
WOR-05-05	few f and common vf pores lined with 10YR3/4, slicken sides on cracks, organins															
WOR-05-06	few vf pores lined with 7.5YR3/4, slicken sides, organins															
WOR-05-07	few vf pores lined with 7.5YR3/4, plant remnants visible, slicken sides, organins															
WOR-05-08	few vf pores lined with 7.5YR3/4, plant remnants visible															
WOR-05-09	plant remnansts visible, powdery mass 2.5Y8/6 with sulfur smell, clear flat needle crystals (manganese) purple staining on slicken sides, organins, outside															
WOR-05-10	plant remnansts visible, powdery mass 2.5Y8/6 with sulfur smell, clear flat needle crystals (manganese) purple staining on slicken sides, organins, outside															
WOR-05-11	no pores, uniform															

Core Identification	WRI-06-01							Weather				clear cool windy				
Core Location	502.9 m west and 45.7m south of the northeast corner of sec.							% slope				0-1				
Collection Date	10/31/2001							Vegetation/Cropping Systems				corn and beans				
Diameter (cm)	6.26							Described by				Beth Larabee				
Length (cm)	124.0							DescriptionDate				7/17/2002				
County	Wright							Classification				Terric Haplosaprist				
									Sturcture							
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	% Total Carbon	Effervescence	pH
WRI-06-01-01	01-1093	Oap	6.26	16.0	10YR2/1	<1	fr	2	2	f	gr	M	C	16.2	NE	4.40
WRI-06-01-02	01-1094	Oa	6.26	35.5	10YR2/1 10YR3/1	<1	fr	2	2	f	gr	M	C	11.5	NE	3.95
WRI-06-01-03	01-1095	2A	6.26	81.0	10YR2/1 10YR3/1 10YR3/2	0	fr	1	1	f	gr	MSIL	G	4.5	NE	5.39
WRI-06-01-04	01-1096	2A2	6.26	97.5	107R3/1	0	fr	<1	1 bk. 1	none bk. f	m bk. gr	SIL	G	2.8	NE	7.18
WRI-06-01-05	01-1097	2Bwg	6.26	124.0	2.5Y4/1 2.5Y4/3 2.4Y8/3	0	fr	0	1	f	sbk	SIL		3.6	SL	7.65
WRI-06-01-01	crop remnants visible, vf roots, sand grains visible on ped surfaces															
WRI-06-01-02	crop remnants visible few f & vf pores,sand grains visible on ped surfaces															
WRI-06-01-03	common f & vf pores lined with 5Y3/4, sand grains visible on ped surfaces															
WRI-06-01-04	many vf pores lined with 5Y3/4, several <1cm silt lenses 2.5Y6/3 in color															
WRI-06-01-05	2cm muck (10YR2/1) at top, common vf pores lined with 5Y3/4, vertical cracks lined with 2.5Y4/3, fine lenses of 2.5Y8/3 strongly effervescent, common clay coatings, organins															

Core Identification	WRI-06-02							Weather				clear cool windy				
Core Location	502.9 m west and 45.7m south of the northeast corner of sec.							% slope				0-1				
Collection Date	10/31/2001							Vegetation/Cropping Systems				corn and beans				
Diameter (cm)	3.8							Described by				Beth Larabee				
Length (cm)	124.0							DescriptionDate				7/17/2002				
County	Wright							Classification				Terric Haplosaprist				
									Sturcture							
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	% Total Carbon	Effervescence	pH
WRI-06-02-01	01-1098	Oap	3.80	12.0	10YR2/1	<1	fr	2	2	f	gr	M	C	16.0	NE	4.77
WRI-06-02-02	01-1099	Oa	3.80	31.5	10YR2/1 10YR3/1	<1	fr	1	2	f	gr	M	G	13.2	NE	4.03
WRI-06-02-03	01-1100	Oa2	3.80	49.0	10YR2/1 10YR3/1 10YR 3/2	0	fr	<1	2	f	gr	M	C	10.1	NE	4.31
WRI-06-02-04	01-1101	2A	3.80	66.5	10YR2/1 10YR3/1	0	fr	0	1	f	sbk	MSIL	G	4.0	NE	5.40
WRI-06-02-05	01-1102	2A	3.80	94.0	10YR2/1	0	fr	0	1	f	sbk	SIL	A	1.9	NE	7.25
WRI-06-02-06	01-1103	2Ag	3.80	104.0	5Y4/1	0	fr	0	1	f	sbk	SIL	A	3.2	NE	7.44
WRI-06-02-07	01-1104	2Bwg	3.80	123.0	5Y4/2	0	fr	0	1	f	sbk	SIL		4.8	SL	7.72
WRI-06-02-01	crop remnants visible, vf roots, sand grains visible on ped surfaces															
WRI-06-02-02	crop remnants visible, vf roots, sand grains visible on ped surfaces															
WRI-06-02-03	vf roots, few vf pores, sand grains visible on ped surfaces															
WRI-06-02-04	few vf pores lined with 5Y3/4															
WRI-06-02-05	common vf pores lined with 5Y3/4, 1-2 cm silt lenses color varies (2.5Y, 4/2, 2.5Y3/3, 2.5Y6/4)															
WRI-06-02-06	common vf pores lined with 5Y4/3, few <1cm lenses of (2.5Y6/2, 5Y4/2) single 1 cm organic lense 10YR2/1															
WRI-06-02-07	common vf pores lined with 7.5Y4/6, fine layering of 2.5Y6/2 strongly effervescence, 2-2cm oxidized mottles 2.5Y4/4, horizon seperates at each oxidized area, common clay skins very dark, few organans															

Core Identification	WRI-06-03							Weather				clear cool windy				
Core Location	502.9 m west and 45.7m south of the northeast corner of sec.							% slope				0-1				
Collection Date	10/31/2001							Vegetation/Cropping Systems				corn and beans				
Diameter (cm)	3.87							Described by				Beth Larabee				
Length (cm)	120.0							DescriptionDate				7/18/2002				
County	Wright							Classification				Terric Haplosaprist				
								%	Sturcture					% Total		
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH
WRI-06-03-01	01-1105	Oap	3.87	12.0	10YR2/1	<1	fr	2	2	f	gr	M	C	16.4	NE	5.54
WRI-06-03-02	01-1106	Oap	3.87	39.0	10YR2/1 10YR3/1	<1	fr	1	2	f	gr	M	G	12.2	NE	5.10
WRI-06-03-03	01-1107	2A	3.87	66.0	10YR2/1 10YR3/1 10YR3/2	0	fr	<1	2	f	gr	MSIL	C	5.9	NE	6.03
WRI-06-03-04	01-1108	2A1	3.87	80.0	10YR2/1 10YR3/1	0	fr	0	2	f	gr	SIL	C	1.4	NE	3.93
WRI-06-03-05	01-1109	2A2	3.87	98.5	10YR2/1	0	fr	0	2	f	gr	SIL	A	2.0	NE	7.18
WRI-06-03-06	01-1110	2AB	3.87	106.5	5Y4/1	0	fr	0	2	f	gr	SIL	A	3.0	SL	7.63
WRI-06-03-07	01-1111	2Bwg	3.87	120.0	5Y5/1	0	fr	0	1	f	sbk	SIL		5.3	ST	7.89
WRI-06-03-01	crop remnants visible, vf roots, sand grains visible on ped surfaces															
WRI-06-03-02	vf roots, sand grains visible on ped surfaces															
WRI-06-03-03	few vf pores lined with 7.5Y3/4															
WRI-06-03-04	many vf pores lined with 7.5Y3/4, 5cm silt lense 2.5YR5/3															
WRI-06-03-05	many vf pores lined with 7.5Y3/4, 5cm silt lense 2.5YR5/3bounded above and below with organic material															
WRI-06-03-06	many vf pores lined with 5YR4/3, fine layering 2.5Y6/2 strongly effervescent, few clay skins, organins															
WRI-06-03-07	many f & vf pores lined with 10YR4/4, fine layering 2.5Y6/2 strongly effervescent, mottling oxidized 10YR4/4, few clay skins															

CER-00							Weather				cold and clear				
733 ft. west and 77 ft. south of the northeast corner Sec. 15, T. 97 N., R. 22 W.							% slope				0-2				
11/16/2001							Vegetation/Cropping Systems				corn and beans				
3.87							Described by				Beth E. Larabee				
116.5							DescriptionDate				3/17/2003				
Cerro Gordo							Classification				Typic Calciaquoll				
			Max.	Moist				Sturcture					% Total		
Sample	Horizon	Dia.	Depth	Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH
01-1278	A1	3.87	24.0	10YR2/1	1	fr	2	1	vf	gr	SIL	G	7.7	VE	7.82
01-1279	A2	3.87	42.0	10YR2.1 10YR3/1 5Y3/1	<1	fr	1	1	f	gr	SIL	C	3.5	ST	7.97
01-1280	A3	3.87	52.0	10YR3/1 5Y3/1 2.5Y6/2	0	fr	0	1	f	gr	SIL	A	3.0	ST	8.21
01-1281	Btg	3.87	67.5	5Y3/1 5Y5/2	0	fr	0	1	f	sbk	SIL	A	1.6	ST	8.08
01-1282	Btg2	3.87	83.4	5Y4/2 5Y4/3 5Y3/1	0	fr	0	1	vf	sbk	SI	G	1.9	ST	8.02
01-1283	Btg3	3.87	116.5	5Y4/2 2.5Y4/2	0	fr	0	1	vf	sbk	SI		2.5	ST	7.94
no visible pores, vf roots, crop remants, sand grains visible on ped surfaces, few snail shell fragments															
few vf pores, vf roots, sand grains visible on ped surfaces, common snail shell fragments															
few f and vf pores, few snail shell fragments															
few f and vf pores, weathered granite lense, flecks of 5Y8/1snail shell remnants															
many f and vf pores, flecks of 5Y8/1snail shell remnants															
many f and vf pores, 10% oxidized 10YR4/6															

CER-01							Weather				cold and clear				
733 ft. west and 77 ft. south of the northeast corner Sec. 15, T. 97 N., R. 22 W.							% slope				0-2				
11/16/2001							Vegetation/Cropping Systems				corn and beans				
6.33, 3.82, 4.20							Described by				Beth E. Larabee				
238.0							DescriptionDate				2/24/2003				
Cerro Gordo							Classification								
								Sturcture							
Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	% Total Carbon	Effervescence	pH
01-1284	Oap	6.33	9.0	10YR2/1	1	fr	2	2	vf	gr	M	A	10.0	NE	6.89
01-1285	Oa1	6.33	32.5	10YR2/1	<1	fi	1	2	m & f	gr	M	C	11.6	NE	6.94
01-1286	Oa2	6.33	55.5	10YR2/1	0	fr	1	2	vf	gr	M	C	17.1	NE	6.34
01-1287	2A1	6.33	108.5	10YR2/1	0	fi	<1	2 bk 2	TN bk f	pl bk. gr	SIL	G	4.8	NE	6.36
01-1288	2A2	6.33	130.5	10YR2/1 10YR3/1	0	fi	0	1	f	sbk	SIL	C	4.3	VS	6.67
01-1289	2A3	3.82	147.5	10YR2/1 2.5Y4/3	0	fr	0	2	f	gr	SI	G	4.3	NE	7.16
01-1290	2Btg	3.82	174.5	5Y4/2 5Y8/2 2.5Y4/4	0	fr	0	1 bk. 1	TN bk f	pl bk. sbk	SIL	C	3.2	SL	7.77
01-1291	2Bt	3.82	200.5	2.5Y4/3	0	fr	0	1 bk. 2 & none	TN bk f & none	pl bk. sbk & sg	SL	C	2.0	SL	7.94
01-1292	2Btg'	4.20	214.5	2.5Y4/3	0	fr	0	1 & none	f & none	sbk & sg	SL	C	1.7	ST	7.97
01-1293	2Btg"	4.20	238.0	5Y4/1 5Y4/2 10YR4/3	0	fr	0	1	f	sbk	SIL		2.1	ST	8.01
no pores visible, vf roots crop remnants															
few vf pores, vf roots, sand grains visible on ped surfaces, few snail shell remnants															
few vf pores, vf roots, sand grains visible on ped surfaces, slicken sides															
silt and very fine sand lenses <1cm thick and 2.5Y3/3 in color															
many m, f and vf pores, 1.5cm lense 2.5Y4/4 in color															
common f and vf pores, initially hydrophobic															
many m and f pores lined with 10YR4/6, a few pores have purple (manganese) linings, few sand lenses 2.5Y5/3 in color,common clay skins															
few f pores lined with 10YR4/6, a few pores have purple (manganese) linings, few sand lenses 2.5Y5/3 in color, few clay skins															
few f pores, few have purple (manganese) linings, very sandy, few silt lenses, few clay skins															
few m and f pores few have purple (manganese) linings, 2% oxidized 10YR4/3 in color, few clay skins															

CER-02							Weather				cold and clear				
733 ft. west and 77 ft. south of the northeast corner Sec. 15, T. 97 N., R. 22 W.							% slope				0-2				
11/16/2001							Vegetation/Cropping Systems				corn and beans				
6.09, 3.71, 4.48							Described by				Beth E. Larabee				
323.0							DescriptionDate				1/20/2003				
Cerro Gordo							Classification				Terric Haplosaprist				
			Max.	Moist				Sturcture					% Total		
Sample	Horizon	Dia.	Depth	Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH
01-1229	Oa	6.09	40.5	10YR2/1	1	fr	1	1	vf	gr	M	D	18.3	NE	6.99
01-1230	Oa2	6.09	87.5	10YR2/1 10YR4/3	2	fi	0	1 bk. 2	none bk. TN & VN	m bk. pl	M	V	23.6	NE	5.89
01-1231	2Ab	6.09	94.5	10YR2/12. 4Y4/4 2.5Y3/3	3	fr	0	1	vf	sbk	MSIL	D	2.6	NE	6.47
01-1232	Oab'	3.71	122.0	10YR2/1	0	fr	0	1 bk. 1	VN bk. vf	pl bk. gr	M	A	11.2	NE	6.02
01-1233	2Ab	3.71	141.5	10YR2/1 2.5Y4/4	0	fr	0	1	none	m	MSIL	C	2.3	NE	6.73
01-1234	Oab"	3.71	174.5	10YR4/3 10YR2/1	0	fr	0	1	f	gr	M	C	10.6	NE	6.21
01-1235	Oab'''	3.71	190.0	10YR2/1 7.5YR4/4 5Y4/1	0	fi	0	1	TN	pl	M	A	24.9	NE	3.45
01-1236	Oab''''	3.71	209.5	10YR4/6 10YR3/2 10YR2/1	0	fi	0	1 bk. 2	none bk. f	m bk. gr	M	A	18.3	NE	2.71
01-1237	Oab'''''	4.48	230.0	10YR2/1	0	vfr	0	1	f	gr	M	A	15.7	NE	7.08
01-1238	Oab''''''	4.48	269.5	5YR3/3	0	vfr	0	1	none	m	M	A	14.9	NE	6.21
01-1239	Oib	4.48	286.5	10YR3/2 5Y3/1	0	vfr	0	1	VN	pl	M	A	12.9	NE	6.53
01-1240	2Bwg1	4.48	298.0	5Y4/1 2.5Y4/2	0	fr	0	1	none	m	SIL	A	2.9	NE	6.37
01-1241	2Bwg2	4.48	323.0	5Y5/1 2.5Y4/1 2.5Y4/3	0	fr	0	1 bk. 2	none bk. f	m bk. sbk	SL		4.2	SL	7.98
no visible pores, vf roots, few 10YR4/6 1-2 mm lenses, crop remnants visibe on ped surfaces, sand grains visible on ped surfaces															
no visible pores, vf roots, 4 mm 10YR4/6 sand lense, crop remnants visible, sand grains visible on ped surfaces															
common f and vf pores lined with 10YR3/3, sand grains visible on ped surfaces															
few f and vf pores lined with 10YR 3/3, sand grains visible on ped surfaces															
few f and vf pores lined with 10YR 3/3, silt lense 3 cm thick,															
no visible pores,, slicken sides, 1.5 cm sand lense - mostly quartz 2.5Y8/1 in color															
few vf pores, sand grains visible on ped surfaces, clear needle like crystals, sand grains visible on ped surfaces, visible seed pods															
lenses of sand grains, seed pods 3-4 mm															
very mushy, slicken sides on crack surfaces 5YR3/4 in color															
extremely mushy, spongy															
spongy visible plant remnant															
tooth paste consistancy															
many small stones															

CER-03							Weather				cold and clear				
733 ft. west and 77 ft. south of the northeast corner Sec. 15, T. 97 N., R. 22 W.							% slope				0-2				
11/16/2001							Vegetation/Cropping Systems				corn and beans				
6.34							Described by				Beth E. Larabee				
118.5							DescriptionDate				1/20/2003				
Cerro Gordo							Classification				Terric Haplosaprist				
								Sturcture							
Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	% Total Carbon	Effervescence	pH
01-1247	Oap	6.34	14.0	10YR2/1	<1	fr	1	1	f	gr	M	A	16.6	NE	7.15
01-1248	Oa	6.34	39.5	10YR2/1	0	fr	<1	1 bk 2	TN bk. f	pl bk. gr	M	C	13.2	NE	6.63
01-1249	2A1	6.34	48.5	10YR2/3 10YR3/3	0	fr	0	2 bk.1	TN bk. f	pl bk. gr	SL	A	1.8	NE	7.30
01-1250	2A2	6.34	118.5	10YR2/2 10YR2/1	0	fr	0	1	f & vf	gr	SL		1.7	VS	7.57
initially hydrophobic, no visible pores, vf roots, crop remnants visible, sand grains visible on ped surfaces															
initially hydrophobic, no visible pores, vf roots, crop remnants visible, sand grains visible on ped surfaces, distinctly layered															
no visible pores, plant remnants visible, sand grains visible on ped surfaces															
many f and vf pores, sand grains visible on ped surfaces, slicken sides, sand lenses 1-2mm and 2.5Y3/2 in color, few charcoal fragments, few 2.5Y8/2 powdery mansses very slightly effervescent															

CER-04							Weather				cold and clear				
733 ft. west and 77 ft. south of the northeast corner Sec. 15, T. 97 N., R. 22 W.							% slope				0-2				
11/8/2001							Vegetation/Cropping Systems				corn and beans				
3.8							Described by				Beth E. Larabee				
124.5							DescriptionDate				2/17/2003				
Cerro Gordo							Classification				Typic Argialboll				
								Sturcture							
Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	% Total Carbon	Effervescence	pH
01-1273	Oa	3.80	17.5	10YR2/1	<1	fr	1	1	f & m	gr	M	A	12.0	NE	7.06
01-1274	2Bw	3.80	24.0	2.5Y4/1 2.5Y4/2	0	fr	<1	1	f	gr	SL	C	1.8	VS	7.76
01-1275	2Bwg	3.80	59.0	10YR4/4 2.5Y5/2 2.5Y4/1	0	fr	0	1	vf	sbk	SL	G	2.9	SL	8.08
01-1276	2Btg1	3.80	104.0	5Y4/1 2.5Y4/3	0	fr	0	2	f	sbk	L	C	2.5	SL	7.81
01-1277	2Btg2	3.80	124.5	10YR3/4 2.5Y4/1	0	fr	0	2	f	sbk	CL		2.2	ST	7.86
hydrophobic, no visible pores, vf roots, crop remnants visible, sand grains visible on ped surfaces,															
few m and f pores lined with 10YR4/4, few clay skins															
many m and f pores lined 10YR4/6, few clay skins															
many m and f pores lined with 10YR4/6 some faint purple brown (manganese) staining, common clay skins															
many m and f pores lined with 10YR3/4, 20% oxidized 10YR3/4, common clay skins															

CER-05							Weather					cold and clear				
733 ft. west and 77 ft. south of the northeast corner Sec. 15, T. 97 N., R. 22 W.							% slope					0-2				
11/16/2001							Vegetation/Cropping Systems					corn and beans				
6.40, 4.10, 4.08							Described by					Beth E. Larabee				
215.0							DescriptionDate					3/2/2003				
Cerro Gordo							Classification					Terric Haplosaprist				
			Max.	Moist				Sturcture						% Total		
Sample	Horizon	Dia.	Depth	Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH	
01-1307	Oa	6.40	14.5	10YR2/1	<1	fr	fr	2	f	gr		A	20.7	NE	6.55	
01-1308	Oa2	6.40	57.0	10YR2/1	0	fr	fr	1 bk. 2	VN bk. f	pl bk. gr		A	20.8	NE	6.35	
01-1309	2Ab1	6.40	77.0	10YR2/1	0	fr	fr	1 bk. 2	TN bk.m & f	pl bk. gr		A	6.1	NE	6.56	
01-1242	2Ab2	4.10	93.5	10YR2/1	0	fr	fr	2	f	gr		G	8.1	NE	6.87	
01-1243	2Ab3	4.10	139.5	10YR2/1 10YR3/1 2.5Y3/1	0	fr	fr	2	f	gr		G	2.7	NE	7.10	
01-1244	2Ab4	4.10	156.5	10YR2/1 10YR3/2	0	fr	fr	2	f	gr		C	2.9	NE	7.00	
01-1245	Oab	4.10	160.0	10YR2/1 10YR3/4	0	fi	fi	1	VN	pl		C	19.5	NE	6.37	
01-1246	Oib1	4.10	192.0	10YR2/1 10YR3/3 7.5YR4/6	0	fi	fi	1 bk. 2	none bk. VN	m bk. pl		C	12.5	NE	4.88	
01-1310	Oib2	4.08	210.0	10YR2/1	0	fr	fr	1	f	gr		A	20.2	NE	6.44	
01-1311	2Ab'	4.08	215.0	2.5Y3/2	0	fr	fr	1	none	m			5.3	SL	7.22	
few vf pores, vf roots, crop remnants visible, sand grains visible on ped surfaces																
few vf pores, vf roots, sand grains visible on ped surfaces, single layer sand lenses, sand grains visible on ped surfaces																
many f and vf pores worm casts visible, single layer sand lenses																
common f & vf pores, sand grains visible on ped surfaces, flecks of 2.5Y4/3																
common f & vf pores, sand grains visible on ped surfaces, slicken sides																
common f and vf pores, sand grains visible on ped surfaces																
few f and vf pores, prominent sand lense																
no pores, sand grains visible on ped surfaces, seed hulls,																
no pores, sand grains visible on ped surfaces, seed hulls,																
no pore, very fine sand layers, 5% mottle 10YR4/4 in color, flecks of 2.5Y8/1																

CER-06							Weather					cold and clear				
733 ft. west and 77 ft. south of the northeast corner Sec. 15, T. 97 N., R. 22 W.							% slope					0-2				
11/8/2001							Vegetation/Cropping Systems					corn and beans				
4.16							Described by					Beth E. Larabee				
120.0							DescriptionDate					3/2/2003				
Cerro Gordo							Classification					Terric Haplosaprist				
			Max.	Moist				Sturcture						% Total		
Sample	Horizon	Dia.	Depth	Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH	
01-1312	Oap	4.16	7.0	10YR2/1	0	fr	1	1	vf	gr	M	A	12.5	NE	6.90	
01-1313	Oa	4.16	31.0	10YR2/1	0	fr	<1	2 bk. 1	TN bk. vf	pl bk. gr	M	C	9.5	NE	6.88	
01-1314	2A	4.16	45.0	10YR2/1	0	fr	<1	2	f	gr	SIL	C	2.8	VS	7.00	
01-1315	2Cg1	4.16	105.0	10YR2/1 1YR4/1	0	fr	0	1 & none	f & none	gr & sg	SICL	G	1.6	VS	7.68	
01-1316	2Cg2	4.16	120.0	10YR3/2 10YR4/1	0	fr	0	1 & none	f & none	gr & sg	SIL		1.5	VS	7.40	
no visible pores, vf roots, sand grains visible on ped surfaces																
no visibel pores, sand grains visible on ped surfaces, few >1mm sand lenses 10YR4/1 in color																
common f and vf pores, worm casts, few >1mm sand lenses 10YR4/1 in color, few 2mm stones																
common f and vf pores, sand and gravel lenses, some 5Y8/1 stones slightly effervescence																
many vf pores																

CER-07							Weather					cold and clear				
733 ft. west and 77 ft. south of the northeast corner Sec. 15, T. 97 N., R. 22 W.							% slope					0-2				
11/8/2001							Vegetation/Cropping Systems					corn and beans				
4.15							Described by					Beth E. Larabee				
125.5							DescriptionDate					3/18/2003				
Cerro Gordo							Classification					Terric Haplosaprist				
			Max.	Moist				Sturcture						% Total		
Sample	Horizon	Dia.	Depth	Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH	
01-1317	Oa1	4.15	16.5	10YR2/1	<1	fr	2	1	m & f	gr	M	A	16.1	NE	6.98	
01-1318	Oa2	4.15	28.5	10YR2/1	0	fr	1		f	gr	M	A	14.0	NE	6.92	
01-1319	Oa3	4.15	42.0	10YR2/1 2.5Y4/3	0	fr	<1	2 bk. 1	M bk. f	pl bk. sbk	M	A	11.2	NE	6.61	
01-1320	2A	4.15	62.0	10YR2/1 2.5Y5/4 2.5Y4/2	0	fi	<1	1	f	sbk	CL	C	2.9	VS	7.21	
01-1321	2Bwg	4.15	80.0	10YR2/1 5Y4/2 2.5Y5/3	0	fr	0	2	f	sbk	SIL	G	2.8	ST	8.09	
01-1322	2BC	4.15	125.5	5Y3/2 2.5Y4/3	0	fr	0	2	f	sbk	SIL		1.9	ST	8.05	
no visible pores, vf roots, crop remnants visible, sand grains visible on ped surfaces																
no visible pores, vf roots, crop remnants visible, sand grains visible on ped surfaces, one 1cm soft nodule 10YR4/4/ in color																
no visible pores, vf roots, sand grains visible on ped surfaces																
many f and vf pores, few <1cm stonens 5Y8/1 slightly effervescent																
many f and vf pores lined with 7.5YR3/4, 1% oxidized 7.5Y5/6, few <1cm stonens 5Y8/1 slightly effervescent, rare clay skins																
many f and vf pores, few m pores, lined with 7.5YR3/4, few fine 7.5YR3/4 oxidized areas																

CER-08							Weather					cold and clear				
733 ft. west and 77 ft. south of the northeast corner Sec. 15, T. 97 N., R. 22 W.							% slope					0-2				
11/16/2001							Vegetation/Cropping Systems					corn and beans				
3.79							Described by					Beth E. Larabee				
120.0							DescriptionDate					3/25/2003				
Cerro Gordo							Classification					Terric Haplosaprist				
			Max.	Moist				Sturcture						% Total		
Sample	Horizon	Dia.	Depth	Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH	
01-1323	Oa1	3.79	19.0	10YR2/1	0	fr	1	1	vf	gr		A	21.3	NE	6.81	
01-1324	Oa2	3.79	47.5	10YR2/1	0	fr	<1	2 bk. 2	M bk. f	pl bk. gr		G	18.2	NE	6.08	
01-1325	2A	3.79	72.0	10YR2/1 2.5Y3/1 2.5Y4/3	0	fr	<1	2 bk. 2	M bk. f	pl bk. gr		C	7.2	SL	6.36	
01-1326	2AB	3.79	85.5	10YR2/1 2.5Y4/4 2.5Y4/3 2.5Y4/2	0	fr	0	2	f	gr		C	3.0	NE	7.34	
01-1327	2Bwg	3.79	93.5	2.5Y2.5/1 2.5Y3/2	0	fr	0	1	f	sbk		C	4.1	SL	7.35	
01-1328	2Bw	3.79	99.5	2.5Y4/3 2.5Y3/3 2.5Y3/2	0	fr	0	1 bk. 1	TN bk. f	pl bk. gr		C	4.1	SL	7.34	
01-1329	2Bwg'	3.79	120.0	5Y4/2 2.5Y3/2	0	fr	0	1	f	sbk	SI		2.6	SL	8.09	
no visible pores, vf roots, crop remnants visible, sand grains visible on ped surfaces																
few f and vf pores, vf roots, 10YR3/6 plant remnants, sand grains visible on ped surfaces																
common f and vf pores, vf roots, sand grains visible on ped surfaces																
common f pores, many snail shell remnants, rare charcoal																
common fine pores lined with 7.5Y3/4, sand grains visible on ped surfaces																
common fine and vf pores lined with 7.5Y3/3																
common fine and vf pores lined with 7.5Y3/3																

CER-09							Weather				cold and clear				
733 ft. west and 77 ft. south of the northeast corner Sec. 15, T. 97 N., R. 22 W.							% slope				0-2				
11/16/2001							Vegetation/Cropping Systems				corn and beans				
3.78							Described by				Beth E. Larabee				
117.5							DescriptionDate				2/12/2003				
Cerro Gordo							Classification				Typic Haplaquoll				
			Max.	Moist				Sturcture					% Total		
Sample	Horizon	Dia.	Depth	Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH
01-1253	Ap	3.78	11.0	10YR2/1	<1	fr	5	2	vf	gr	L	A	6.9	NE	7.46
01-1254	A	3.78	25.0	10YR2/1	<1	fr	1	2	f	gr	L	A	5.3	NE	7.29
01-1255	AB	3.78	34.5	5Y4/2	0	fr	0	2 & none	f & none	gr & sg	SL	C	1.4	SL	7.94
01-1256	Bag	3.78	50.5	5Y4/2	0	fr	0	2 & none	f & none	gr & sg	SL	A	1.8	ST	8.01
01-1257	Bwg	3.78	62.0	2.5Y4/3	0	fr	0	1	f	sbk	LS	A	2.3	ST	7.93
01-1258	C1	3.78	70.5	2.5Y4/3	0	fr	0	1 & none	none & none	m & sg	SL	C	3.2	ST	7.94
01-1259	Cg	3.78	117.5	2.5Y4/2	0	fr	0	1 & none	none & none	m & sg	SL		2.2	ST	8.07
no visible pores, f and vf roots, crop remnants visible															
few vf pores, f and vf roots															
few f and vf pores lined with 10YR4/4															
few f and vf pores lined with 10YR4/4, several 102 mm lenses 2.5Y8/1 in color															
few f anf vf pores lined with 5Y4/6															
stone line															
common f and vf pores lined with 5Y4/6															

Core Identification	WRI-10							Weather				cool, clear, windy				
Core Location	1650 ft. west and 150ft. South of the northeast corner of Sec. 2, T.90N.,R.25 W.							% slope				0-1				
Collection Date	10/31/2001							Vegetation/Cropping Systems				corn/bean				
Diameter (cm)	3.81							Described by				Beth Larabee				
Length (cm)	123.0							DescriptionDate				9/12/2002				
County	Wright							Classification				Typic Calciaquoll				
									Sturcture					% Total		
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH
WRI-10-01	01-1134	Ap	3.81	9.0	10YR2/1	<1	l	<1	1	f	gr	SIL	A	6.2	NE	6.94
WRI-10-02	01-1135	A	3.81	20.5	10YR2/1	<1	fr	<1	2	f	fr	SIL	C	5.9	NE	7.01
WRI-10-03	01-1136	AB	3.81	39.0	5Y5/4 2.5Y4/3	0	fi	0	1	f	sbk	CL	G	2.4	SL	7.78
WRI-10-04	01-1137	Bkwg	3.81	53.0	5Y5/1 2.5Y4/4	0	fi	0	2	f	sbk	SIL	A	2.1	ST	7.64
WRI-10-05	01-1138	BCkg	3.81	123.0	5Y5/1 2.5Y4/4	0	fi	0	2	f	sbk	SIL		2.6	ST	7.72
WRI-10-01	no visible pores, crop remnants visible															
WRI-10-02	few vf pores, crop remants visible, few 1-2 mm stones 10YR8/2 effervescent															
WRI-10-03	common f and vf pores few lined with 10YR2/1, few 1-2 mm stones 10YR8/2 effervescent, small areas of 2.5Y4/1															
WRI-10-04	common f and vf pores, few m pores lined with 7/5YR5/6, iron concretions, few 1-2 mm stones 10YR8/2 effervescent, 30% oxidized10YR5/6, few clay skins															
WRI-10-05	many m, f, and vf pores, few 1-2 mm stones 10YR8/2 effervescent, 20% oxidized 10YR5/8															

CER-11							Weather				cold and clear				
733 ft. west and 77 ft. south of the northeast corner Sec. 15, T. 97 N., R. 22 W.							% slope				0-2				
11/16/2001							Vegetation/Cropping Systems				corn and beans				
4.18							Described by				Beth E. Larabee				
123.5							DescriptionDate				2/28/2003				
Cerro Gordo							Classification				Typic Haplaquoll				
			Max.	Moist				Sturcture					% Total		
Sample	Horizon	Dia.	Depth	Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH
01-1330	Ap	4.18	7.5	10YR2/1	<1	fr	2	1	vf	gr	SIL	A	6.4	ST	7.65
01-1331	A1	4.18	20.5	10YR2/2	<1	fr	1	2	m	gr	SIL	C	5.7	ST	7.80
01-1332	A2	4.18	32.0	2.5Y2.5/1 2.5Y3/3	0	fr	<1	1	vf	gr	SIL	C	3.9	ST	7.98
01-1333	ABg	4.18	57.5	2.5Y 4/2 2.5Y5/2 2.5Y5/3	0	fr	<1	1	f	sbk	L	C	3.3	ST	7.98
01-1334	Bt	4.18	79.0	2.5Y 6/3 2.5Y3/3 2.5Y3/2	0	fr		1	f	sbk	L	G	3.0	ST	8.07
01-1335	Bwg1	4.18	109.0	10YR4/6 2.5Y5/3	0	fr		2	f	sbk	SIL	C	2.1	ST	8.09
01-1336	Bwg2	4.18	117.5	10YR4/6 2.5Y5/3 2/5Y7/2	0	fr	0	2	f	sbk	L	A	2.0	ST	7.99
01-1337	BC	4.18	123.5	10YR3/4 2.5Y4/3	0	fr	0	2	f	sbk	SICL		2.1	ST	7.97
no visible pores, vf roots, crop remnants															
few vf pores, vf roots,															
few vf pores, vf roots, small areas of 2.5Y4/3															
many f pores, common m pores, vf roots, few clay skins															
common f and vf pores lined with 10YR3/4, weathered granite lense, common clay skins															
few vf pores lined with 10YR3/4, areas of oxidation 10YR3/4 and 10YR4/6 in color															
30% oxidized 10YR4/6, few clay skins															
20% oxidized 10YR3/4, few clay skins															

CER-12							Weather				cold and clear				
733 ft. west and 77 ft. south of the northeast corner Sec. 15, T. 97 N., R. 22 W.							% slope				0-2				
11/8/2001							Vegetation/Cropping Systems				corn and beans				
4.14							Described by				Beth E. Larabee				
124.0							DescriptionDate				2/20/2003				
Cerro Gordo							Classification				Typic Haplaquoll				
			Max.	Moist				Sturcture					% Total		
Sample	Horizon	Dia.	Depth	Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH
01-1338	Oap	4.14	13.0	10YR2/1	<1	fr	<1	2	f	gr	M	A	13.6	NE	6.51
01-1339	Oap	4.14	22.5	10YR2/1	<1	l	1	2	m & f	gr	M	A	15.0	NE	6.33
01-1340	2A	4.14	61.0	10YR2/1	0	fr	0	1	f	sbk	SL	G	1.7	NE	7.21
01-1341	2AB	4.14	78.0	10YR2/1 5Y4/2	0	fr	0	1	f	sbk	SL	A	1.4	NE	7.64
01-1342	2BA	4.14	89.0	2.5Y4/2 2.5Y5/4	0	l	0	none	none	sg	LS	A	5.8	NE	7.47
01-1343	2Bwg2	4.14	98.5	2.5Y4/1 2.5Y3/2	0	fi	0	1 bk. 1	VN bk. f	pl bk. sbk	SI	C	6.6	VS	6.99
01-1344	2Bwg3	4.14	109.5	5Y5/2	0	fi	0	1 bk. 1	f bk. F	pl bk. sbk	SICL	C	3.7	SL	7.84
01-1345	2Btg	4.14	124.0	5Y4/2	0	fi	0	2	f	sbk	SICL		1.9	SL	7.89
few vf pores, vf root, crop remnants visible, sand grains visible on ped surfaces															
few vf pores, vf roots, crop remnants visible, sand grains visible on ped surfaces															
many f and vf pores faint linings of 10YR3/2, soft masses of 2.5Y7/2 slightly effervescent															
many f and vf pores linings of 10YR3/2, soft masses of 2.5Y7/2 slightly effervescent															
many vf pores lined with 10YR4/6, few clay skins															
few vf pores, purplish lining (manganese)															
many f and vf pores lined with 10YR4/6, specs of 5Y8/1															
many f and vf pores lined with 10YR3/6, specs of 5Y8/1															

CER-13							Weather				cold and clear				
733 ft. west and 77 ft. south of the northeast corner Sec. 15, T. 97 N., R. 22 W.							% slope				0-2				
11/8/2001							Vegetation/Cropping Systems				corn and beans				
4.19							Described by				Beth E. Larabee				
123.0							DescriptionDate				2/27/2003				
Cerro Gordo							Classification				Terric Haplosaprist				
			Max.	Moist				Sturcture					% Total		
Sample	Horizon	Dia.	Depth	Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH
01-1346	Oap	4.19	5.0	10YR2/1	1	fr	3	1	vf	gr	M	A	16.5	NE	6.87
01-1347	Oa1	4.19	21.5	10YR2/1	<1	fr	2	2	m	gr	M	C	19.2	NE	6.98
01-1348	Oa2	4.19	47.0	10YR2/1	0	fr	<1	2	m & f	gr	M	C	16.8	NE	6.43
01-1349	2Bwg1	4.19	75.5	2.5Y5/2 2.5Y4/2 2.5Y3/2	0	fr	0	2	m	sbk	SIL	G	2.6	ST	8.00
01-1350	2Bwg2	4.19	101.0	5Y4/2 5Y4/3	0	fr	0	1 bk. 2	TN bk. f	pl bk. sbk	L	G	2.8	ST	7.96
01-1351	2Bt	4.19	123.0	5Y3/1 2.5Y4/3	0	fr	0	2	f	sbk	CL		2.0	ST	7.90
no visible pores, vf roots, crop remnants, sand grains visible on ped surfaces.															
no visible pores, vf roots, sand grains visible on ped surfaces.															
no visible pores, vf roots, sand grains visible on ped surfaces.															
common fine pores, many m poes, lined with 7.5Y3/4, single concentration of iron pyrite crystals, few clay skins															
common m and f pores most lined with 7.5Y3/4 and a few lined in purple (manganese) few clay skins															
common f pores lined with 7.5Y4/6, 3% oxidized 10YR3/4, 1% oxidized 7.5Y4/6, common clay skins															

Core Identification	STO-01							Weather				cold and clear				
Core Location	1950 ft. west and 60 ft south of the northeast corner of sec.14, T.83N.							% slope				0-2				
Collection Date	10/18/2001							Vegetation/Cropping Systems				soybean/corn				
Diameter (cm)	3.84							Described by				Beth Larabee				
Length (cm)	98.5							DescriptionDate				1/28/2001				
County	Story							Classification				Terric Haplosaprist				
				Max.	Moist				Sturcture					% Total		
ID Number	Sample	Horizon	Dia.	Depth	Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH
STO-01-01	01-0802	Oap	3.84	6.0	10YR2/1	<1	fr	<1	2	f	gr	M	C	15.8	NE	5.60
STO-01-02	01-0803	Oa	3.84	28.5	10YR2/1	0	fr	<1	2	m & f	gr	M	G	16.7	NE	5.58
STO-01-03	01-0804	Oa2	3.84	60.5	10YR2/1	0	fi	<1	2	VN	pl	M	G	18.8	NE	5.33
STO-01-04	01-0805	Oa3	3.84	74.0	10YR2/1	0	fi	<1	1 bk. 2	VN bk. f	pl bk. gr	M	G	15.8	NE	5.53
STO-01-05	01-0806	Oa4	3.84	91.0	10YR2/1	0	fi	0	1	none	ma	M	C	10.6	NE	5.73
STO-01-06	01-0807	2C	3.84	98.5	7.5YR2.5/1 2.5Y5/4	0	fr	0	1	none	ma	MSIL		2.7	NE	6.53
STO-01-01	vf roots, crop remnants visible															
STO-01-02	vf roots, worm holes & worm casts															
STO-01-03	vf roots, worm holes & worm casts, few plant remnants 7.5YR2.5/3 in color															
STO-01-04	vf roots															
STO-01-05	uniform															
STO-01-06	lenses of silt and fine sand															

Core Identification	STO-02							Weather				cold and clear				
Core Location	1950 ft. west and 60 ft south of the northeast corner of sec.14, T.83N.							% slope				0-2				
Collection Date	10/18/2001							Vegetation/Cropping Systems				soybean/corn				
Diameter (cm)	3.83							Described by				Beth Larabee				
Length (cm)	120.0							DescriptionDate				1/28/2001				
County	Story							Classification				Terric Haplosaprist				
				Max.	Moist				Sturcture					% Total		
ID Number	Sample	Horizon	Dia.	Depth	Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH
STO-02-01	01-0851	Oa	3.83	49.0	10YR2/1	1	fr	<1	1 bk. 2	VN bk. f	pl bk. Gr	M	A	14.4	NE	6.23
STO-02-02	01-0852	2A	3.83	56.0	7.5YR 2.5/1	0	fr	0	2	f	gr	SIL	A	3.1	NE	7.33
STO-02-03	01-0853	2A	3.83	67.5	5Y5/3 10YR2/1	0		0	1	none	m	L	A	2.9	VS	7.60
STO-02-04	01-0854	2Bw	3.83	80.0	5Y5/3 10YR2/1	0	fi	0	1 bk. 1	none bk. f	ma bk. sbk	SC	C	2.9	VS	7.77
STO-02-05	01-0855	2C	3.83	90.5	2.5Y4/3	0	fi	0	none	none	sg	SL	C	2.4	VS	7.82
STO-02-06	01-0856	2C2	3.83	110.0	2.5Y4/3	0	fi	0	1 & 2	none & none	m & sg	COS & SL	C	2.2	VS	7.85
STO-02-07	01-0857	2Cg	3.83	120.0	10YR5/2 10YR4/4	0	fr	0	1 & 2	none & none	m & sg	SL		2.3	SL	7.83
STO-02-01	crop remnants visible, vf roots, common vf pores lined with 5Y4/6, 0.1mm fine sand lenses															
STO-02-02	common vf pores lined with 5Y4/6, few gravel sized particles															
STO-02-03	common f & vf pores lined with 5Y4/6															
STO-02-04	common m, f & vf pores lined with 5Y4/6															
STO-02-05	medium sand lenses layered with sandy clay 2-4 mm sands															
STO-02-06	medium sand lenses (sg) layered with sandy clay and gravel lenses up to 5 mm thick															

Core Identification	STO-03							Weather				cold and clear				
Core Location	1950 ft. west and 60 ft south of the northeast corner of sec.14, T.83N.							% slope				0-2				
Collection Date	10/18/2001							Vegetation/Cropping Systems				soybean/corn				
Diameter (cm)	3.74							Described by				Beth Larabee				
Length (cm)	124.5							DescriptionDate				2/5/2002				
County	Story							Classification				Aquic Hapludoll				
									Sturcture					% Total		
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH
STO-03-01	01-0827	A	3.74	21.0	10YR2/1	0	fr	<1	2	f	gr	M	G	6.8	NE	6.89
STO-03-02	01-0828	AB	3.74	35.5	2.5Y6/2 10YR2/1	0	fi	0	1	f	sbk	CL	C	1.7	NE	7.68
STO-03-03	01-0829	Btg	3.74	55.5	2.5Y6/2 2.5Y3/1	0	fi	0	2	f	sbk	SIC	A	2.3	SL	7.71
STO-03-04	01-0830	BCg	3.74	70.5	2.5Y6/4 5Y4/2	0	fi	0	1	f	sbk	SIC	C	2.5	ST	7.74
STO-03-05	01-0831	CBg	3.74	106.0	5Y4/2	0	fi	0	none & 2	none & f	sg & sbk	L	C	2.4	ST	7.90
STO-03-06	01-0832	C	3.74	124.5	5Y5/3	0	fi	0	none & 2	none & f	sg & sbk	L		2.4	ST	7.88
STO-03-01	crop remnants visible, sand grains visible on ped surfaces															
STO-03-02	mixed light and dark colors, few redox features 2.5YR4/6, small stones up to 1 cm in size															
STO-03-03	mixed light and dark colors, few redox features 2.5YR5/8, common clay skins															
STO-03-04	f & vf pores lined with 2.5YR5/8 few clay skins															
STO-03-05	common sand and gravel lenses															
STO-03-06	sand lenses 2-5 mm															

Core Identification	STO-04							Weather				cold and clear				
Core Location	1950 ft. west and 60 ft south of the northeast corner of sec.14, T.83N.							% slope				0-2				
Collection Date	10/18/2001							Vegetation/Cropping Systems				soybean/corn				
Diameter (cm)	3.85							Described by				Beth Larabee				
Length (cm)	122.0							DescriptionDate				2/6/2002				
County	Story							Classification				Typic Argiaquoll				
									Sturcture					% Total		
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH
STO-04-01	01-0833	Ap	3.85	19.0	10YR2/1	0	fi	<1	2	m & f	gr	SIL	C	5.6	NE	6.81
STO-04-02	01-0834	A	3.85	31.0	10YR2/1 2.5Y5/4	0	fr	0	2	f	gr	SIL	C	3.8	VS	7.37
STO-04-03	01-0835	AB	3.85	44.0	10YR3/4 2.5Y5/4	0	fr	0	2	f	gr	SICL	C	1.1	VS	7.53
STO-04-04	01-0836	BA	3.85	65.5	7.5YR3/1 2.5Y5/3	0	fi	0	2	f	gr	SIL	G	2.2	SL	7.74
STO-04-05	01-0837	Bw	3.85	80.5	10YR5/6 2.5Y6/3	0	fi	<1	1	f	sbk	SIL	G	1.8	SL	7.64
STO-04-06	01-0838	Bt	3.85	95.5	10YR5/8 5Y6/3	0	fi	0	2	f	sbk	SIL	G	2.2	SL	7.62
STO-04-07	01-0839	Btg	3.85	109.0	5Y5/2	0	fi	0	1 & 1	m & f	sbk	SL	G	2.2	ST	7.86
STO-04-08	01-0840	Btg2	3.85	122.0	5Y5/2	0	vfi	0	1 & 1	m & f	sbk	SL		2.2	ST	7.77
STO-04-01	crop remnants, visible small stones and sand grains															
STO-04-02	sand lenses 2.5Y5/2															
STO-04-03	few f pores, sand lenses 2.5Y5/2, visible fine stones															
STO-04-04	m & f pores, few redox features, small 5 mm areas of increased organic matter, few clay skins															
STO-04-05	m & f pores, few redox features, few clay skins, 2mm barklike inclusion															
STO-04-06	f pores, redox features 10YR4/6 oxidation and 6/5GY many clay skins															
STO-04-07	5YR5/6 oxidation, fine gravel visible, many clay skins															
STO-04-08	few f & vf pores, 10YR5/6 oxidation, many clay skins															

Core Identification	STO-05							Weather				cold and clear				
Core Location	1950 ft. west and 60 ft south of the northeast corner of sec.14, T.83N.							% slope				0-2				
Collection Date	10/18/2001							Vegetation/Cropping Systems				soybean/corn				
Diameter (cm)	3.88							Described by				Beth Larabee				
Length (cm)	104.0							DescriptionDate				1/7/2002				
County	Story							Classification				Typic Argiaquoll				
				Max.	Moist				Sturcture						% Total		
ID Number	Sample	Horizon	Dia.	Depth	Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH
STO-05-01	01-0808	Ap	3.88	9.5	7.5YR2.5/1	0	fr	1	2	vf	sbk	SIL	A	4.2	NE	7.38
STO-05-02	01-0809	A	3.88	46.0	7.5YR2.5/2	0	fr	<1	2	f	sbk	SIL	G	3.1	VS	7.42
STO-05-03	01-0810	A2	3.88	65.5	10YR3/1	0	fr	0	2	m & f	sbk	CL	A	1.8	NE	7.31
STO-05-04	01-0811	ABg	3.88	80.0	5Y5/2 2.5Y3/1	0	fi	0	2	m & f	sbk	CL	A	0.9	VS	7.66
STO-05-05	01-0812	Bwg	3.88	88.0	5Y5/2	0	fi	0	1 bk. 2	none bk. F	m bk. Sbk	SICL	G	2.8	VS	7.46
STO-05-06	01-0813	Btg	3.88	94.5	5Y5/2 5Y3/1	0	vfi	0	1	none	m	CL	A	1.2	VS	7.63
STO-05-07	01-0814	Btg2	3.88	104.0	7.5Y4/1	0	vfi	0	1	none	m	SIL		1.8	VS	7.63
STO-05-01	vf roots, crop remnants															
STO-05-02	vf roots, 0.5cm sand lense															
STO-05-03	few fine sand lenses, rare snail shell															
STO-05-04	frequent carbonate masses with powdery consistancy 1.5 cm and smaller 2.5Y8/1 in color															
STO-05-05	frequent carbonate masses 2.5Y8/1 in color, few clay skins															
STO-05-06	frequent carbonate masses 2.5Y8/1 in color, common clay skins															
STO-05-07	frequent carbonate masses 2.5Y8/1 in color, common clay skins															

Core Identification	STO-06							Weather				cold				
Core Location	1950 ft. west and 60 ft south of the northeast corner of sec.14, T.83N.							% slope				0-2				
Collection Date	10/19/2001							Vegetation/Cropping Systems				corn/bean				
Diameter (cm)	3.75							Described by				Beth Larabee				
Length (cm)	177.0							DescriptionDate				3/5/2002				
County	Story							Classification				Terric Medisaprist				
				Max.	Moist				Sturcture						% Total		
ID Number	Sample	Horizon	Dia.	Depth	Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH
STO-06-01	01-0888	Oap	3.75	13.5	10YR2/1	0	fi	2	2	f	gr	M	A	15.7	NE	5.65
STO-06-02	01-0889	Oa	3.75	48.0	10YR2/1	0	fr	1	1 bk. 2	VN bk f	PL bk. Gr	M	C	22.2	NE	5.58
STO-06-03	01-0890	Oa2	3.75	63.0	10YR2/1	2	fr	<1	1 bk. 2	VN bk f	PL bk. Gr	M	C	17.5	NE	5.56
STO-06-04	01-0891	Oa3	3.75	98.5	10YR2/1	0	fr	0	1 bk. 1	VN bk f	PL bk. Gr	M	C	9.1	NE	6.06
STO-06-05	01-0892	Oa4	3.75	137.0	10YR2/1	0	fr	0	1 bk.1	none bk. f	m bk. Gr	M	C	12.3	NE	5.88
STO-06-06	01-0893	2A	3.75	154.0	10YR2/1	0	fr	0	1	none	m	MSI	C	6.9	NE	6.25
STO-06-07	01-0894	Oab1	3.75	161.0	10YR2/1	1	fi	0	1 bk. 2	VN bk f	PL bk. Gr	M	A	29.4	NE	4.75
STO-06-08	01-0895	Oab2	3.75	177.0	10YR2/1 10YR 3/3	1	fi	0	2	f	gr	M		16.2	NE	2.24
STO-06-01	vf roots, crop remnants visible															
STO-06-02	vf roots															
STO-06-03	vf roots, few plant remnants															
STO-06-04	few vf pores, lense of 10YR3/2															
STO-06-05	very few plant remnants visible that are completely destroyed by gentle rubbing															
STO-06-06	uniform massive															
STO-06-07	plant remnants visible than are completely destroyed by gentle rubbing															
STO-06-08	plant remnants visible than are completely destroyed by gentle rubbing															

Core Identification	STO-07							Weather				cold				
Core Location	1950 ft. west and 60 ft south of the northeast corner of sec.14, T.83N.							% slope				0-2				
Collection Date	11/14/2000							Vegetation/Cropping Systems				corn/beans				
Diameter (cm)	6.32							Described by				Beth Larabee				
Length (cm)	125.0							DescriptionDate				3/11/2002				
County	Story							Classification				Terric Haplosaprist				
				Max.	Moist				Sturcture						% Total		
ID Number	Sample	Horizon	Dia.	Depth	Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH
STO-07-01	01-0883	Oap	6.32	22.5	10YR2/1	1	fr	1	2	f	gr	m	A	17.3	NE	5.70
STO-07-02	01-0884	Oa	6.32	38.0	10YR2/1	<1	fi	1	1 bk. 2	none bk. m & f	m bk. gr	m	C	19.7	NE	5.77
STO-07-03	01-0885	Oa	6.32	73.5	10YR2/1	1	fi	0	1 bk. 2	none bk. VN	m bk. pl	m	G	22.8	NE	5.98
STO-07-04	01-0886	Oa	6.32	104.0	7.5YR2.5/1	1	fi	0	1 bk. 2	VN bk. F	pl bk. gr	m	G	20.5	VS	6.91
STO-07-05	01-0887	Oa	6.32	125.0	7.5YR2.5/2	<1	fi	0	1 bk. 2	VN bk. F	pl bk. gr	m		13.7	SL	7.11
STO-07-01	vf roots, crop remnants visible															
STO-07-02	very few plant remnants, rare stani shell remnants 5YR4/6															
STO-07-03	slicken sides on vertical crack, visible plant remnants 2.5YR3/4 in color															
STO-07-04	visible plant remnants that are completely destroyed by gentle rubbing, numerous snail shells															
STO-07-05	visible plant remnants that are completely destroyed by gentle rubbing, numerous snail shells															

Core Identification	STO-08							Weather				cold				
Core Location	1950 ft. west and 60 ft south of the northeast corner of sec.14, T.83N.							% slope				0-2				
Collection Date	11/14/2000							Vegetation/Cropping Systems				corn/bean				
Diameter (cm)	6.24							Described by				Beth Larabee				
Length (cm)	61.0							Description Date				3/25/2002				
County	Story							Classification				Typic Haplludoll				
				Max.	Moist				Sturcture						% Total		
ID Number	Sample	Horizon	Dia.	Depth	Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH
STO-08-01	01-0868	Oa	6.24	7.0	10YR2/1	<1	fr	2	2	f	gr	M	A	8.7	NE	6.67
STO-08-02	01-0869	2A	6.24	14.5	10YR2/1 2.5Y4/3	0	fr	1	2	none	sg	SL	C	1.0	VS	8.00
STO-08-03	01-0870	2C	6.24	60.0	2.5R4/3	0	l	0	2	none	sg	COS			SL	7.60
STO-08-01	crop remnants visible, m & f roots, f & vf pores, worm casting															
STO-08-02	vf roots, worm casts, muck interlayered with sand															
STO-08-03	sand and gravel															

Core Identification	STO-09							Weather				cold				
Core Location	1950 ft. west and 60 ft south of the northeast corner of sec.14, T.83N.							% slope				0-2				
Collection Date	11/14/2000							Vegetation/Cropping Systems				road ditch				
Diameter (cm)	6.5							Described by				Beth Larabee				
Length (cm)	71.0							Description Date				3/21/2002				
County	Story							Classification				Typic Haplludoll				
				Max.	Moist				Sturcture						% Total		
ID Number	Sample	Horizon	Dia.	Depth	Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH
SRO-09-01	01-0864	Ap	6.5	11.50	10YR2/1	<1	fr	2	2	f	gr	ML	A	6.0	NE	7.14
SRO-09-02	01-0865	A	6.5	60.00	10YR5/6	0	l	0	none	none	sgr	COS	C	2.1	SL	8.13
SRO-09-03	01-0866	C1	6.5	67.00	7.5YR4/3	0	fi	0	none	none	sgr	COS	A	0.6	NE	7.56
SRO-09-04	01-0867	C2	6.5	71.00	10YR4/3 7.5YR4/3	0	fi	0	1	nonr	m	L		0.1	SL	7.60
SRO-09-01	vf roots, worm casts, crop remnants															
SRO-09-02	sand and fine gravel, 5% oxidized 2.5YR4/6															
SRO-09-03	sand and fine gravel, 30% oxidized 2.5YR4/6															
SRO-09-04	fine silt and clay lenses 2 cm or less in thickness															

Core Identification	STO-10							Weather				cold				
Core Location	1950 ft. west and 60 ft south of the northeast corner of sec.14, T.83N.							% slope				0-2				
Collection Date	11/14/2000							Vegetation/Cropping Systems				corn/soybean				
Diameter (cm)	6.06							Described by				Beth Larabee				
Length (cm)	127.0							DescriptionDate				4/3/2002				
County	Story							Classification				Terric Haplosaprist				
									Sturcture							
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	% Total Carbon	Effervescence	pH
STO-10-01	01-0871	O	6.06	13.0	10YR2/1	<1	fr	<1	2	f	gr	M	C	17.3	NE	5.91
STO-10-02	01-0872	O	6.06	43.0	10YR2/1	0	fr	<1	1 bk. 2	TN bk. f	pl bk. gr	M	G	19.3	NE	5.81
STO-10-03	01-0873	O	6.06	73.5	10YR2/1	1	fr	0	1 bk. 2	VN bk. m	pl bk. gr	M	G	20.8	NE	6.21
STO-10-04	01-0874	O	6.06	104.0	10YR2/1	<1	fr	0	1 bk. 2	TN bk. f	pl bk. gr	M	C	13.5	NE	6.26
STO-10-05	01-0875	2A	6.06	118.5	10YR2/1 2.5Y4/4	0	fi	0	1 bk. 1	none bk. F	m bk. sbk	Si	C	2.4	NE	7.27
STO-10-06	01-0876	2Bw	6.06	127.0	2.5Y2.5/1	0	fi	0	1 bk. 1	none bk. F	m bk. sbk	Si		9.0	NE	6.94
STO-10-01	crop remnants, vf roots															
STO-10-02	vf roots															
STO-10-03	visible plant remnants that are completely destroyed by gentle rubbing and10YR3/4 in color															
STO-10-04	visible plant remnants that are completely destroyed by gentle rubbing and 10YR3/4 in color															
STO-10-05	f & vf pores, silt lenses 2.5Y4/4 and 2.5Y7/4 in color and 2/5 mm thick,															
STO-10-06	few clay skins															

Core Identification	STO-11							Weather				cold				
Core Location	1950 ft. west and 60 ft south of the northeast corner of sec.14, T.83N.							% slope				0-2				
Collection Date	11/14/2000							Vegetation/Cropping Systems				corn/soybean				
Diameter (cm)	6.35							Described by				Beth Larabee				
Length (cm)	124.0							DescriptionDate				2/26/2002				
County	Story							Classification				Typic Argiaquoll				
									Sturcture							
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	% Total Carbon	Effervescence	pH
STO-11-01	01-0966	Ap	6.35	19.5	10YR8/1	0	fr	<1	2	f	gr	M	A	6.3	NE	7.04
STO-11-02	01-0967	A	6.35	38.5	7.5YR2.5/1	0	fr	<1	2	m & f	gr	SL	G	1.9	NE	7.71
STO-11-03	01-0968	Bkwg	6.35	58.5	10YR3/3 2.5Y5/3 2.5Y4/1	0	fi	<1	1	f	sbk	L	G	2.9	VE	7.88
STO-11-04	01-0969	Bwg	6.35	92.0	10YR2/2 2.5Y4/2	0	fi	1	1	f	sbk	L	G	2.6	VE	7.95
STO-11-05	01-0970	Btg	6.35	124.0	2.5Y4/2	0	fi	0	2	f	sbk	L		2.3	VE	7.96
STO-11-01	vf roots, no visible pores, fine sand grains visible on ped surfaces, few stones slightly effervescent and 5Y8/1 in color															
STO-11-02	vf roots, m, f & vf pores, worm cast, 1-3 cm stones, silt lense 5Y2/5 in color effervesces more strongly than surroundings															
STO-11-03	vf roots, f & vf pores calcite deposits on some pores 5Y8/1 in color, areas of oxidation 7.5YR6/8, mixed areas of 10YR3/3, 2.5Y5/3 and 2.5Y4/1 many stones of limestone, chert and feldspars															
STO-11-04	vf roots, f & vf pores lined with 5YR4/4 , few clay skins, mixed areas of 2.5Y8/3, 7.5YR4/4, 10YR2/2, 2.5Y4/2,															
STO-11-05	f & vf pores common clay skins, 1% oxidized areas 5YR4/6 in color															

Core Identification	STO-12							Weather				cold				
Core Location	1950 ft. west and 60 ft south of the northeast corner of sec.14, T.83N.							% slope				0-2				
Collection Date	10/12/2000							Vegetation/Cropping Systems				corn/soybean				
Diameter (cm)	6.54							Described by				Beth Larabee				
Length (cm)	127.0							DescriptionDate				2/21/2002				
County	Story							Classification				Typic Argiaquoll				
				Max.	Moist				Sturcture						% Total		
ID Number	Sample	Horizon	Dia.	Depth	Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH
STO-12-01	01-0858	Ap	6.54	19.5	7.5YR2.5/1	0	fi	1	2	f	gr	SIL	G	5.3	ST	7.20
STO-12-02	01-0859	A	6.54	42.5	7.5YR2.5/1	0	fi	<1	2	m & f	gr	SIL	C	6.5	VE	7.60
STO-12-03	01-0860	AB	6.54	69.5	7.5YR3/1	0	fi	0	1	f	sbk	SIL	G	1.8	VS	7.70
STO-12-04	01-0861	Bw	6.54	94.5	7.5YR3/1 5Y6/3	0	fi	0	1 bk. 1	none bk. f	m bk. sbk	L	G	1.6	SL	7.86
STO-12-05	01-0862	Bwg	6.54	115.0	2.5Y4/2 2.5Y3/1	0	fi	0	1 bk. 1	none bk. f	m bk. sg	SL	A	2.2	ST	7.94
STO-12-06	01-0863	Btg	6.54	127.0	2.5Y5/2 5Y4/4	0	fi	0	1	m	sbk	L		1.8	VE	7.78
STO-12-01	vf roots, few vf pores,															
STO-12-02	vf roots, common m, f & vf pores															
STO-12-03	m, f & vf pores frequent 1-3 cm stones 2.5Y8/2 in color and very effervescent <1% oxidized 2.5Y3/4 in color															
STO-12-04	f & vf pores, frequent 1-3 cm stones 2.5Y8/2 in color and very effervescent, <1% oxidized 2.5Y3/4 in color															
STO-12-05	frequent 1-3 cm stones 2.5Y8/2 in color and very effervescent															
STO-12-06	f & vf pores, frequent 1-3 cm stones 2.5Y8/2 in color and very effervescent, few sand lenses 2.5Y6/2 in color															

Core Identification	STO-13							Weather				cold				
Core Location	1950 ft. west and 60 ft south of the northeast corner of sec.14, T.83N.							% slope				0-2				
Collection Date	11/14/2000							Vegetation/Cropping Systems				corn/soybean				
Diameter (cm)	6.24							Described by				Beth Larabee				
Length (cm)	122.0							DescriptionDate				3/14/2002				
County	Story							Classification				Typic Argiaquoll				
				Max.	Moist				Sturcture						% Total		
ID Number	Sample	Horizon	Dia.	Depth	Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH
STO-013-01	01-0961	O	6.24	24.5	10YR2/1	0	fr	3	2	f	gr	M	C	NE	NE	5.82
STO-013-02	01-0962	2A	6.24	47.5	10YR3/1 10YR2/1	0	fr	1	2	m & f	gr	SIL	C	NE	NE	7.08
STO-013-03	01-0963	2Btg	6.24	57.0	10YR2/1 5Y4/2	0	fr	<1	2	m & f	sbk	SIL	A	VS	VS	7.34
STO-013-04	01-0964	2Bt	6.24	68.0	10YR2/1 5Y4/3	0	fr	<1	2	m & f	sbk	SICL	A	SL	SL	7.57
STO-013-05	01-0965	2BCg	6.24	99.0	2.5Y5/3 2.5Y6/2	0	fi	<1	none	none	sg	L	C	ST	ST	7.79
STO-013-06	01-0966	2Cg	6.24	122.0	10YR4/1 2.5Y5/3	0	fi	0	none	none	sg	L		ST	ST	7.87
STO-013-01	initially hydrophobic, crop remnants visible, m f & vf roots, common m, f, vf pores															
STO-013-02	initially hydrophobic, vf roots, m f & vf pores, worm casts															
STO-013-03	vf roots, m, f & vf pores, worm casts															
STO-013-04	vf roots, m, f & vf pores, vertical areas of light and dark, few clay skins															
STO-013-05	vf roots, f & vf pores, 2 areas of 10YR2/1,1% oxidized 10YR4/4, sandy lenses, clay skins															
STO-013-06	30% oxidized 7.5YR5/8															

Core Identification	WRI-00							Weather				cool, clear, windy				
Core Location	1650 ft. west and 150ft. South of the northeast corner of Sec. 2, T.90N.,R.25 W.							% slope				0-1				
Collection Date	10/31/2001							Vegetation/Cropping Systems				corn/bean				
Diameter (cm)	3.78							Described by				Beth Larabee				
Length (cm)	124.5							DescriptionDate				9/9/2002				
County	Wright							Classification				Typic Calciaquoll				
									Sturcture							
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	% Total Carbon	Effervescence	pH
WRI-00-01	01-1139	Ap	3.78	16.0	10YR2/1	0	fi	1	2	f	gr	SIL	A	4.2	SL	7.44
WRI-00-02	01-1140	A1	3.78	43.5	10YR2/1 10YR3/1	0	fi	<1	2	f	gr	SIL	C	3.1	SL	7.79
WRI-00-03	01-1141	A2	3.78	59.5	10YR2/1 10YR3/1 10YR4/1	0	fr	<1	1	f	gr	SIL	G	2.1	ST	7.92
WRI-00-04	01-1142	A3	3.78	70.0	10YR3/1 5YR4/2 5YR5/3	0	fr	0	1	f	gr	SIL	C	1.7	ST	7.96
WRI-00-05	01-1143	Cg1	3.78	81.0	5YR4/1 5YR4/3	0	vfr	0	1 & none	none	ma & sg	L	C	2.2	VE	7.97
WRI-00-06	01-1144	Cg2	3.78	111.5	5Y4/2 5Y5/3	0	l	0	1 & none	none	ma & sg	LS	A	1.8	VE	7.98
WRI-00-07	01-1145	C	3.78	124.5	5Y5/3	0	l	0	1 & none	none	ma & sg	LS		1.8	VE	8.05
WRI-00-01	vf roots, crop remnants visible															
WRI-00-02	vf roots, many f & vf pores, few gravel sized stones and powdery masses 10YR8/2 in color and effervescent															
WRI-00-03	vf roots, many f & vf pores, few gravel sized stones and powdery masses 10YR8/2 in color and effervescent															
WRI-00-04	many f & vf pores, few gravel sized stones and powdery masses 10YR8/2 in color and effervescent															
WRI-00-05	common f & vf pores, few gravel sized stones and powdery masses 10YR8/2 in color and effervescent, few oxidized mottles 10YR4/4 in color															
WRI-00-06	no visible pores, few gravel sized stones and powdery masses 10RY8/2 in color and effervescent, common oxidized mottles 10YR4/4 in color															
WRI-00-07	no visible pores, few gravel sized stones and powdery masses 10RY8/2 in color and effervescent, many oxidized mottles 10YR4/4 & 10YR4/6 in color															

Core Identification	WRI-01							Weather				cool, clear, windy				
Core Location	1650 ft. west and 150ft. South of the northeast corner of Sec. 2, T.90N.,R.25 W.							% slope				0-1				
Collection Date	10/31/2001							Vegetation/Cropping Systems				corn/bean				
Diameter (cm)	3.88							Described by				Beth Larabee				
Length (cm)	121.0							DescriptionDate				7/8/2002				
County	Wright							Classification				Typic Calciaquoll				
									Sturcture							
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	% Total Carbon	Effervescence	pH
WRI-01-01	01-1058	Ap	3.88	8.0	10YR2/1	0	fr	2	2	f	gr	SIL	A	4.3	VE	7.40
WRI-01-02	01-1059	A	3.88	22.5	10YR2/1 10YR3/1	0	fr	1	2	f	gr	SIL	C	4.7	SL	7.55
WRI-01-03	01-1060	Ak	3.88	37.0	10YR2/1 10YR3/1 10YR2/2	0	fr	<1	1	f	gr	L	C	3.8	SL	7.79
WRI-01-04	01-1061	AB	3.88	54.0	10YR2/1 10YR4/1 10YR4/2	0	fr	0	1	f	sbk	L	G	2.9	SL	7.89
WRI-01-05	01-1062	Bwg	3.88	73.0	10YR2/1 10YR3/1 10YR5/2	0	fr	0	2	f	sbk	L	C	2.8	SL	7.91
WRI-01-06	01-1063	Bkwg	3.88	89.0	10YR3/1 10YR5/2 10YR6/2	0	fr	0	2	f	sbk	L	C	2.8	ST	8.00
WRI-01-07	01-1064	Bkwg2	3.88	121.0	2.5Y5/2 5Y6/2	0	fr	0	2	f	sbk	L		2.8	ST	7.99
WRI-01-01	vf roots,no visible pores, crop remnants of surface, sand grains visible on ped surfaces															
WRI-01-02	vf roots, few f & vf pores, sand grains visible on ped surfaces, worm casts															
WRI-01-03	vf roots, few f & vf pores, sand grains visible on ped surfaces, worm casts, 11.5 cm lense 10YR8/2 in color and very effervescent															
WRI-01-04	few f & vf pores, sand grains visible on ped surfaces															
WRI-01-05	common f & vf pores, few clay skins, very fine lenses 10YR8/2 in color															
WRI-01-06	common f & vf pores, few clay skins, 1-2 cm stones 10YR8/2 in color and very effervescent, oxidized areas 5YR4/6 in color, vertical cylindar filled with 10YR3/1															
WRI-01-07	no visible pores, few clay skins, 5 cm coarse sand lense, calcium carbonate masses and small stones 10YR8/2 in colore and very effervescent, small inclusions 10YR3/1 and color, manganese concretions															

Core Identification	WRI-02							Weather				cool, clear, windy				
Core Location	1650 ft. west and 150ft. South of the northeast corner of Sec. 2, T.90N.,R.25 W.							% slope				0-1				
Collection Date	10/31/2001							Vegetation/Cropping Systems				corn/bean				
Diameter (cm)	3.82							Described by				Beth Larabee				
Length (cm)	76.5							DescriptionDate				7/8/2002				
County	Wright							Classification				Typic Calciaquoll				
									Sturcture							
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	% Total Carbon	Effervescence	pH
WRI-02-01	01-1065	A	3.82	31.0	10YR2/1	0	fr	<1	2	f	gr	SIL	C	2.0	VS	4.96
WRI-02-02	01-1066	a	3.82	44.0	5Y4/2	0	fr	<1	1	f	gr	SIL	A	1.3	VS	3.76
WRI-02-03	01-1067	A2	3.82	51.5	5Y4/3	0	fr	<1	1	f	sbk	L	A	2.2	VS	3.94
WRI-02-04	01-1068	C	3.82	65.0	2.5Y5/3 2.5Y3/2	0	fr	0	2	f	sbk	L	C	1.8	VS	5.09
WRI-02-05	01-1069	Ckg	3.82	76.5	10YR3/3 2.5Y4/2	0	fr	0	2	f	sbk	SIL		1.8	ST	7.35
WRI-02-01	initially hydrophobic, vf roots, few vf pores, crop remnants visible on soil surface, sand grains visibel on ped surfaces															
WRI-02-02	vf roots, few f & vf pores lined with 7.5Y3/4, small areas 5Y4/1 and 10YR2/1 in color															
WRI-02-03	vf roots, few f & vf pores lined with 7.5Y3/4, small areas 5Y4/1 and 10YR2/1 in color,few clay skins,															
WRI-02-04	common f & vf pores lined with 7.5Y3/4, small areas of 10YR2/1,one 3 cm lense 2.5Y8/2 in color and slightly effervescent															
WRI-02-05	common f & vf pores lined with 7.5Y3/4, small areas of 10YR2/1, carabonate masses 2.5Y8/2 in color and slightly effervescent, 45% sand															

Core Identification	WRI-03							Weather				cool, clear, windy				
Core Location	1650 ft. west and 150ft. South of the northeast corner of Sec. 2, T.90N.,R.25 W.							% slope				0-1				
Collection Date	10/31/2001							Vegetation/Cropping Systems				corn/bean				
Diameter (cm)	3.87							Described by				Beth Larabee				
Length (cm)	121.5							DescriptionDate				7/9/2002				
County	Wright							Classification				Terric Haplosaprist				
									Sturcture							
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	% Total Carbon	Effervescence	pH
WRI-03-01	01-1070	Oa1	3.87	22.0	10YR2/1	<1	fr	3	2	f	gr	M	C	11.7	NE	6.20
WRI-03-02	01-1071	Oa2	3.87	37.0	10YR2/1 10YR3/1	<1	fr	2	2 bk. 2	VN bk. F	PL bk gr	M	C	9.9	NE	4.71
WRI-03-03	01-1072	Oa3	3.87	54.0	10YR2/1	0	fr	2	2	f	gr	M	C	8.2	NE	7.78
WRI-03-04	01-1073	2Ab1	3.87	93.5	10YR2/1 10YR3/1	0	fr	2	1	f	sbk	Si	G	2.7	NE	5.94
WRI-03-05	01-1074	2Ab2	3.87	111.0	10YR2/1 10YR3/2	0	fr	0	2	f	sbk	Si	A	2.0	NE	6.88
WRI-03-06	01-1075	2AB	3.87	212.5	5Y5/1	0	fr	0	2	f	sbk	SIL		1.8	VS	7.18
WRI-03-01	f & vf roots, few f & vf pores, crop remnants visible on soil surface, very small white lifeform?															
WRI-03-02	few plant remnants 10YR3/4 in color, sand grains visible on ped surfaces, silt lense 2.5Y5/3															
WRI-03-03	vf roots, few vf pores lined with 10YR3/4, sand grains visible on ped surfaces															
WRI-03-04	vf roots, common vf pores lined with 5Y4/6, slicken sides on some ped surfaces															
WRI-03-05	few vf pores lined with 10YR4/2 silt lense 10YR4/2 in color															
WRI-03-06	few vf pores lined with 103/6, 5% oxidized 10YR4/6 in color															

Core Identification	WRI-04							Weather				cool, clear, windy				
Core Location	1650 ft. west and 150ft. South of the northeast corner of Sec. 2, T.90N.,R.25 W.							% slope				0-1				
Collection Date	10/31/2001							Vegetation/Cropping Systems				corn/bean				
Diameter (cm)	3.70							Described by				Beth Larabee				
Length (cm)	160.0							DescriptionDate				7/9/2002				
County	Wright							Classification				Terric Haplosaprist				
									Sturcture							
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	% Total Carbon	Effervescence	pH
WRI-04-01	01-1076	Oap	3.70	18.0	10YR2/1	<1	fr	2	2	f	gr	M	C	14.0	NE	4.95
WRI-04-02	01-1077	Oa	3.70	53.5	10YR2/1	<1	fr	1	1 bk 2	TN bk f	pl bk gr	M	C	12.0	NE	4.02
WRI-04-03	01-1078	2A	3.70	81.0	10YR2/1	0	fr	<1	1 bk. 2	none bk. f	m bk. gr	Si	A	4.8	NE	4.55
WRI-04-04	01-1079	2Bw	3.70	96.0	10YR2/1 2.5Y6/3 2.5Y5/3	0	fr	<1	1	f	sbk	Si	A	0.6	NE	6.13
WRI-04-05	01-1080	2Bt	3.70	124.5	10YR2/1 2.5Y3/1	0	fr	0	1 bk. 2	none bk. f	m bk. gr	Si	A	4.2	NE	7.20
WRI-04-06	01-1081	2Cg1	3.70	139.0	10YR3/3 2.5Y4/1 2.5Y4/2	0	fr	0	2	TN & VN	pl	L	A	7.9	NE	6.76
WRI-04-07	01-1082	2Cg2	3.70	160.0	5Y4/1 5Y3/2	0	fr	0	1 bk. 1	none bk. TN	m bk. pl	SIL		4.8	VS	7.20
WRI-04-01	m & f roots, no visible pores, sand grains visible on ped surfaces															
WRI-04-02	f & vf roots, many vf pores, 10% of pores lined with 10YR3/3, very fine lenses of sand and sand grains visible on ped surfaces															
WRI-04-03	common vf pores lined with 5YR3/4, silt lenses 2.5Y7/4 in color															
WRI-04-04	common vf pores lined with 5YR3/4, 10 cm silt lense 2.5Y6/4 & 2.5Y5/3 in color, few clay skins															
WRI-04-05	many vf pores lined with 10YR3/3 and 5Y3/4, few plant remnants visible, disintigrate completely with gentle rubbing, common clay skins, many snail shell fragments															
WRI-04-06	few vf pores lined with 5Y3/4 very layered no snail shells															
WRI-04-07	few vf pores, very layered, very decomposed snail shells															

Core Identification	WRI-05							Weather				cool, clear, windy				
Core Location	1650 ft. west and 150ft. South of the northeast corner of Sec. 2, T.90N.,R.25 W.							% slope				0-1				
Collection Date	10/31/2001							Vegetation/Cropping Systems				corn/bean				
Diameter (cm)	6.13 and 3.86							Described by				Beth Larabee				
Length (cm)	202.0							DescriptionDate				7/17/2002				
County	Wright							Classification				Terric Haplosaprist				
									Sturcture							
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	% Total Carbon	Effervescence	pH
WRI-05-01	01-1083	Oap	6.13	17.5	10YR2/1	0	fr	2	2	f	gr	M	C	18.5	NE	4.11
WRI-05-02	01-1084	Oa	6.13	83.0	10YR2/1	0	fr	1	2	f & m	gr	M	A	8.4	NE	4.52
WRI-05-03	01-1085	2C	3.86	96.0	10YR2/1 10YR3/1 10YR4/3 2.5Y5/4	0	fr	0	2 & none	f & none	gr & sg	SIL	A	0.7	VS	6.83
WRI-05-04	01-1086	2C	3.86	109.0	10YR3/2 2.5Y5/4 2.5Y5/6	0	fr	0	1	f	sbk	SIL	A	0.9	NE	7.46
WRI-05-05	01-1087	2Ab	3.86	118.5	10YR3/1	0	fr	0	1	f	sbk	SIL	A	3.3	VS	7.36
WRI-05-06	01-1088	2Ab	3.86	127.0	10YR3/1 2.5Y3/2	0	fr	0	1	f	sbk	SIL	C	2.8	VS	7.63
WRI-05-07	01-1089	2Ab	3.86	151.5	10YR3/1	0	fr	0	1 bk 2	none bk. F	m bk sbk	SIL	G	4.4	VS	7.73
WRI-05-08	01-1090	2Ab	3.86	167.0	10YR3/1	0	fr	0	2	VN & f	PL & sbk	SICL	C	4.1	VS	7.46
WRI-05-09	01-1091	3Oab	3.86	176.0	2.5Y4/2 2.5Y4/3	0	fr	0	2	VN	PL	M	C	11.8	SL	7.02
WRI-05-10	01-1092	4Ab	3.86	202.0	5Y4/1 5Y5/2	0	fr	0	1	none	m	SIL		4.6	SL	7.44
WRI-05-01	few vf pores, f & vf roots															
WRI-05-02																
WRI-05-03	f & vf pores lined wh 2.5YR4/8, manganese concentrations, some mottling															
WRI-05-04	many f & vf pores lined with 2.5YR3/6, some pores filled with 10YR3/2 many snail shell fragments															
WRI-05-05	few vf pores lined with 2.5YR3/6, silt lense 2.5Y4/3 in color															
WRI-05-06	common vf pores, few snail shell fragments															
WRI-05-07	common vf pores lined with 7.5YR4/6, vertical crack face also 7.5YR4/6 common clay skins, many snail shell fragments															
WRI-05-08	few vf pores lined with 7.5YR4/6, vertical crack face also 7.5YR4/6 many snail shell fragments, 2cm platy layer															
WRI-05-09	few vf pores lined with 7.5YR4/6															
WRI-05-10	few vf pores lined with 7.5YR4/6, matrix of 5Y5/2 and 5Y4/2, areas of 10YR4/4															

Core Identification	WRI-06							Weather				cool, clear, windy				
Core Location	1650 ft. west and 150ft. South of the northeast corner of Sec. 2, T.90N.,R.25 W.							% slope				0-1				
Collection Date	10/31/2001							Vegetation/Cropping Systems				corn/bean				
Diameter (cm)	3.78							Described by				Beth Larabee				
Length (cm)	96.0							DescriptionDate				5/1/2003				
County	Wright							Classification				Typic Calciaquoll				
									Sturcture					% Total		
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH
WRI-06-01	01-1383	Ap	3.78	15.5	10YR3/1 10YR2/1	<1	fr	<1	1	vf	gr	MSIL	C	4.8	SL	6.87
WRI-06-02	01-1384	Ak	3.78	30.5	2.5Y2.5/1 2.5Y 3/2 2.5Y4/4	0	fr	0	1	vf	gr	MSIL	G	3.6	VS	7.54
WRI-06-03	01-1385	ABkg	3.78	56.5	2.5Y2.5/1 2.5Y 3/2 2.5Y4/4	0	fr	0	1	vf	sbk	SIL	C	4.5	SL	7.60
WRI-06-04	01-1386	Bag	3.78	68.0	2.5Y3/1 2.5Y4/2 10YR2/1	0	fr	0	1	vf	gr	SIL	C	4.8	SL	7.16
WRI-06-05	01-1387	Bwg	3.78	82.5	2.5Y4/1 5Y4/2 10YR2/1	0	fi	0	1	VN	PL	SIL	G	4.0	VS	7.53
WRI-06-06	01-1388	BCg	3.78	96.0	2.5Y5/1 2.5Y4/4	0	fi	0	2	f	sbk	SI		4.2	ST	7.66
WRI-06-01	common vf pores lined with 10YR3/4, 3% snail shells5Y8/1 in color															
WRI-06-02	common vf pores lined with 10YR3/4 & 10YR4/4, 3% snail shells 5Y8/1 in color															
WRI-06-03	many vf pores lined with 10YR4/4, many snail shells 5Y8/1 in color															
WRI-06-04	common vf pores lined with 7.5Y3/4															
WRI-06-05	common vf pores, few clay skins, fine 1mm 2.5Y8/3 silt lense															
WRI-06-06	flecks of 2.5Y8/3 snail shell remnants															

Core Identification	WRI-07							Weather				cool, clear, windy				
Core Location	1650 ft. west and 150ft. South of the northeast corner of Sec. 2, T.90N.,R.25 W.							% slope				0-1				
Collection Date	11/1/2001							Vegetation/Cropping Systems				corn/bean				
Diameter (cm)	3.98							Described by				Beth Larabee				
Length (cm)	306.0							DescriptionDate				5/1/2003				
County	Wright							Classification				Terric Haplosaprist				
									Sturcture					% Total		
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH
WRI-07-01	01-1112	Oa	3.98	28.50	10YR2/1	0	fi	<1	2	f	gr	M	G	11.8	NE	6.68
WRI-07-02	01-1113	2A1	3.98	75.50	10YR2/1 10YR 2/2	0	fr	0	1 bk. 2	none bk. f	m bk. gr	SIL	G	6.7	NE	5.45
WRI-07-03	01-1114	2A2	3.98	108.00	10YR2/1	<1	fr	0	1 bk. 1	none bk. f	m bk. gr	SIL	C	4.7	NE	5.51
WRI-07-04	01-1115	Oi	3.98	146.00	10YR2/1	<1	fr	0	2 and 2	TN and VN	pl and pl	M	A	29.5	NE	1.72
WRI-07-05	01-1116	2Ab	3.98	179.50	10YR2/1	1	fr	0	1 bk. 1	none bk. f	m bk. sbk	SIL	D	4.5	NE	2.45
WRI-07-06	01-1117	2Abg	3.98	230.00	5Y4/1 10YR2/1	0	fr	0	1 bk. 1	vf bk. f	pr bk. sbk	SIL	A	4.4	NE	5.64
WRI-07-07	01-1118	Oabg	3.98	240.00	5Y4/1 10YR2/1 10YR3/1	4	mushy	0	2	f	gr	M	A	27.7	NE	1.87
WRI-07-08	01-1119	Oibg	3.98	287.50	10YR2/1 10YR3/1 2.5YR4/2 2.5YR3/2 2.5YR3/1	4	fi	0	3	TN	pl	M	A	21.6	NE	1.99
WRI-07-09	01-1120	C	3.98	306.00	5Y3/1	0	fi	0	1 bk. 2	none bk. VN	m bk. pl	SIL		5.3	ST	6.99
WRI-07-01	few vf roots, crop remnants visible, sand grains visible on ped surfaces															
WRI-07-02	few vf roots, common f and vf pores few lined with 2.5Y4/8															
WRI-07-03	no roots, few f and vf pores lined with 2.5Y4/8, common 10YR6/4 o.5 cm silt lenses, rare 10YR4/2 0.5 cm fine sand lenses															
WRI-07-04	plant remnants visible, outside of core slightly lighter in color than the interior, surface of core spotted with clear colorless needle like crystals especially in pores and cracks, also surgar like clear crystals very reflective, also irregular opaque white grains															
WRI-07-05	areas of crystals at pores and cracks, few vf pores lined with 2.5Y4/8															
WRI-07-06	few vf pores lined with 2.5Y4/8, few clay skins															
WRI-07-07	very loose wet mushy, transparent clear needlelike crystals throuhgout, inclusions of 10YR5/8															
WRI-07-08	partially decomposed plant materials, water can be squeezed from material															
WRI-07-09	2cm 10YR2/1 organic material marked very fine layering 2.5Y8/2 few very fine snail shell fragments															

Core Identification	WRI-08							Weather				cool, clear, windy				
Core Location	1650 ft. west and 150ft. South of the northeast corner of Sec. 2, T.90N.,R.25 W.							% slope				0-1				
Collection Date	11/1/2001							Vegetation/Cropping Systems				corn/bean				
Diameter (cm)	3.85							Described by				Beth Larabee				
Length (cm)	96.0							DescriptionDate				9/5/2002				
County	Wright							Classification				Aquic Hapludoll				
									Sturcture							
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	% Total Carbon	Effervescence	pH
WRI-08-01	01-1121	Ap	3.58	21.5	10YR2/1	<1	fr	2	2	f	gr	M	G	6.8	NE	6.55
WRI-08-02	01-1122	A	3.58	45.5	10YR2/1	0	fr	<1	1 bk. 2	f bk. F	pl bk. Gr	M	C	4.1	NE	6.95
WRI-08-03	01-1123	g	3.58	53.0	5Y2.5/1 5Y3/2	0	fr	0	1 and none	none and none	m and sg	LS	C	0.6	NE	7.29
WRI-08-04	01-1124	g	3.58	62.0	5Y4/2	0	fr	0	1 and none	none and none	m and sg	LS	C	0.9	SL	7.73
WRI-08-05	01-1125	g	3.58	84.0	5Y4/2 5Y4/1	0	fr	0	2	f	gr	LS	A	1.3	SL	7.76
WRI-08-06	01-1126	Cg	3.58	96.0	2.5Y4/2	0	fr	0	none	none	sg	S		0.4	SL	7.66
WRI-08-01	vf roots, no visible por4s crop remnants visible on ped surfaces, worm casts, krotovina															
WRI-08-02	common f and vf pores, sand grains visible on ped surfaces, few very fine sand lenses.															
WRI-08-03	no visible pores, 5Y2.5/1 and 5Y3/2															
WRI-08-04	few f & vf pores lined with 7.5YR3/2, 20% oxidized 2.5Y8/2 ,small stones slightly effervescent, small areas with 5Y4/2 and 5Y3/2															
WRI-08-05	oxidized 2.5Y4/4, sand and stones visible, may 2.5Y8/2 slightly effervescent, few clay skins, few sand lenses															
WRI-08-06	uniform fine sand															

Core Identification	WRI-09							Weather				cool, clear, windy				
Core Location	1650 ft. west and 150ft. South of the northeast corner of Sec. 2, T.90N.,R.25 W.							% slope				0-1				
Collection Date	10/31/2001							Vegetation/Cropping Systems				corn/bean				
Diameter (cm)	3.79							Described by				Beth Larabee				
Length (cm)	112.5							DescriptionDate				9/5/2002				
County	Wright							Classification				Aquic Hapludoll				
									Sturcture							
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	% Total Carbon	Effervescence	pH
WRI-09-01	01-1127	A1	3.79	22.5	10YR2/1	0	fr	<1	2	f	gr	SIL	A	3.3	NE	7.42
WRI-09-02	01-1128	A2	3.79	37.0	5Y4/2 5Y2.5/1	0	fr	0	2	f	gr	SIL	A	0.9	NE	7.48
WRI-09-03	01-1129	A3	3.79	48.0	2.5YR4/2 2.5YR3/2	0	fi	0	2	f	gr	SIL	C	1.0	NE	7.65
WRI-09-04	01-1130	A4	3.79	61.5	2.5YR4/2 2.5YR4/3 2.5YR3/1	0	fi	0	1	none	m	SIL	A	1.3	NE	7.75
WRI-09-05	01-1131	Cg1	3.79	69.0	5Y4/2	0	fi	0	1	none	m	SIL	A	1.6	SL	7.62
WRI-09-06	01-1132	Cg2	3.79	84.5	5Y5/1 5Y4/3	0	fi	0	none	none	sg	SIL	G	1.5	SL	7.68
WRI-09-07	01-1133	C	3.79	112.5	2.5Y4/3	0	fi	0	1	none	m	SIL		1.5	SL	7.67
WRI-09-01	vf roots, few vf pores crop remnants visible, sand grains visible on ped surfaces, 5Y6/2 very fine silt lenses															
WRI-09-02	no roots, few vf pores, areas of 5Y4/2 and 5Y2.5/1, 1% oxidation 10YR3/6 in color, few fine sand lenses															
WRI-09-03	common f and vf pores lined with 10YR3/6, oxidationof 2.5Y4/3,2.5Y3/1 and 2.5YR4/2															
WRI-09-04	common f and vf pores lined with 10YR3/6, oxidationof 2.5Y4/3,2.5Y3/1 and 2.5YR4/2															
WRI-09-05	common f and vf pores few lined with 10YR3/6, small areas 5Y3/4 in color															
WRI-09-06	common f and vf pores lined with 10YR3/6, small stones and powder 5Y8/2 in color,															
WRI-09-07	few f and vf pores, small stones and powder 5Y8/2 in color, 10% oxidized 10YR5/8 & 10YR3/6 in color															

Core Identification	WRI-10							Weather				cool, clear, windy				
Core Location	1650 ft. west and 150ft. South of the northeast corner of Sec. 2, T.90N.,R.25 W.							% slope				0-1				
Collection Date	10/31/2001							Vegetation/Cropping Systems				corn/bean				
Diameter (cm)	3.81							Described by				Beth Larabee				
Length (cm)	123.0							DescriptionDate				9/12/2002				
County	Wright							Classification				Typic Calciaquoll				
									Sturcture							
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	% Total Carbon	Effervescence	pH
WRI-10-01	01-1134	Ap	3.81	9.0	10YR2/1	<1	l	<1	1	f	gr	SIL	A	6.2	NE	6.94
WRI-10-02	01-1135	A	3.81	20.5	10YR2/1	<1	fr	<1	2	f	fr	SIL	C	5.9	NE	7.01
WRI-10-03	01-1136	AB	3.81	39.0	5Y5/4 2.5Y4/3	0	fi	0	1	f	sbk	CL	G	2.4	SL	7.78
WRI-10-04	01-1137	Bkwg	3.81	53.0	5Y5/1 2.5Y4/4	0	fi	0	2	f	sbk	SIL	A	2.1	ST	7.64
WRI-10-05	01-1138	BCkg	3.81	123.0	5Y5/1 2.5Y4/4	0	fi	0	2	f	sbk	SIL		2.6	ST	7.72
WRI-10-01	no visible pores, crop remnants visible															
WRI-10-02	few vf pores, crop remants visible, few 1-2 mm stones 10YR8/2 effervescent															
WRI-10-03	common f and vf pores few lined with 10YR2/1, few 1-2 mm stones 10YR8/2 effervescent, small areas of 2.5Y4/1															
WRI-10-04	common f and vf pores, few m pores lined with 7/5YR5/6, iron concretions, few 1-2 mm stones 10YR8/2 effervescent, 30% oxidized10YR5/6, few clay skins															
WRI-10-05	many m, f, and vf pores, few 1-2 mm stones 10YR8/2 effervescent, 20% oxidized 10YR5/8															

Core Identification	WRI-11							Weather				cool, clear, windy				
Core Location	1650 ft. west and 150ft. South of the northeast corner of Sec. 2, T.90N.,R.25 W.							% slope				0-1				
Collection Date	10/31/2001							Vegetation/Cropping Systems				corn/bean				
Diameter (cm)	3.90							Described by				Beth Larabee				
Length (cm)	119.0							DescriptionDate				9/12/2002				
County	Wright							Classification				Typic Calciaquoll				
									Sturcture							
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	% Total Carbon	Effervescence	pH
WRI-11-01	01-1146	Oa	119.00	11.5	10YR2/1	<1	l	1	1	f	gr	M	A	11.7	NE	5.01
WRI-11-02	01-1147	A	119.00	36.0	10YR2/1	<1	fr	2	2	f	gr	SIL	C	7.4	NE	4.96
WRI-11-03	01-1148	AB	119.00	47.0	10YR2/2 5Y5/3	0	fr	<1	sg and 2	none and f	none and gr	SL	C	1.8	SL	6.99
WRI-11-04	01-1149	2Bwg1	119.00	67.5	5Y4/2 5Y4/3	0	fr	0	1 and 1	non and f	none and gr	SIL	G	1.5	ST	7.62
WRI-11-05	01-1150	2Bwg2	119.00	111.0	5Y4/2	0	fr	0	sg and 2	none and f	none and gr	SL	A	2.0	ST	7.73
WRI-11-06	01-1151	C	119.00	119.0	5Y3/2 10YR4/3	0	fi	0	1	f	sbk	L		1.2	ST	7.48
WRI-11-01	no pores visible, plant remnants visible															
WRI-11-02	common m, f and vf pores, sand grains visible on ped surfaces															
WRI-11-03	common m, f and vf pores, sand grains visible on ped surfaces, 1-3 cm sand lense, few 1-2mm 10Yr8/2 effervescent															
WRI-11-04	many m f and vf pores lined with 10YR3/4, 3% fine mottling 5YR4/4, iron pyrite crystals, rare clay skins															
WRI-11-05	no visible pores, mostly fine sand with 5mm silty clay lenses 5Y5/2 and 5Y4/1 in color, iron concretionsand few clay skins in silty clay lenses															
WRI-11-06	no visible pores, few 1-2mm stones 10YR8/2 evervescent, 5% oxidized 10YR4/3															

Core Identification	WRI-12							Weather				cool, clear, windy				
Core Location	1650 ft. west and 150ft. South of the northeast corner of Sec. 2, T.90N.,R.25 W.							% slope				0-1				
Collection Date	10/31/2001							Vegetation/Cropping Systems				corn/bean				
Diameter (cm)	3.72							Described by				Beth Larabee				
Length (cm)	117.0							DescriptionDate				9/23/2002				
County	Wright							Classification				Typic Haplaquoll				
									Sturcture							
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	% Total Carbon	Effervescence	pH
WRI-12-01	01-1186	Oa	3.72	18.5	19YR2.1	<1	fr	1	1	f	gr	M	G	17.4	NE	4.46
WRI-12-02	01-1187	2A1	3.72	53.0	10YR2/1 10YR3/1	0	fr	1	1 bk. 1	TN bk. f	pl bk. Gr	M	G	9.9	NE	4.15
WRI-12-03	01-1188	2A2	3.72	87.0	10YR 2/1	0	fi	<1	1 bk. 1	none bk. f	none bk. Gr	SIL	A	4.1	NE	4.73
WRI-12-04	01-1189	Oab	3.72	100.5	10YR2/1	0	1	0	1	f	gr	M	A	11.8	NE	4.32
WRI-12-05	01-1190	2C1	3.72	109.0	10YR2/1 10YR3/3	0	fi	0	1	none	m	SIL	A	2.9	NE	6.04
WRI-12-06	01-1191	2C2	3.72	117.0	10YR2/1 10YR5/3	0	fi	0	1	none	m	SIL		2.9	NE	6.78
WRI-12-01	no visible pores, crop remnants visible															
WRI-12-02	f and vf roots															
WRI-12-03	few vf pores lined with 5YR4/6, few fine sand lenses															
WRI-12-04	few f and vf pores lined with 5YR4/6 and 10YR3/4															
WRI-12-05	few f and vf pores lined with 5YR4/6 and 10YR3/4															
WRI-12-06	few f and vf pores lined with 5YR4/6															

Core Identification	WRI-13							Weather				cool, clear, windy				
Core Location	1650 ft. west and 150ft. South of the northeast corner of Sec. 2, T.90N.,R.25 W.							% slope				0-1				
Collection Date	10/31/2001							Vegetation/Cropping Systems				corn/bean				
Diameter (cm)	3.84							Described by				Beth Larabee				
Length (cm)	128.0							DescriptionDate				9/15/2002				
County	Wright							Classification				Typic Haplaquoll				
									Sturcture							
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	% Total Carbon	Effervescence	pH
WRI-13-01	01-1158	Oap	3.84	16.0	10YR2/1	1	fr	2	1	f	gr	M	A	20.9	NE	4.00
WRI-13-02	01-1159	Oa1	3.84	29.5	10YR2/1	<1	fr	2	2	f	gr	M	A	20.8	NE	3.70
WRI-13-03	01-1160	Oa2	3.84	52.5	10YR2/1	<1	fr	<1	1 bk. 2	TN bk. f	pl bk. Gr	M	C	9.1	NE	4.10
WRI-13-04	01-1161	Bwg	3.84	70.0	2.5Y4/1 2.5Y3/1 2.5Y2.5/1	0	fi	<1	1	f	sbk	SICL	G	1.8	ST	6.20
WRI-13-05	01-1162	Btg	3.84	99.5	2.5Y4/1 2.5Y4/3	0	fr	0	2	f	bk	SIL	C	2.5	ST	7.60
WRI-13-06	01-1163	BCg	3.84	111.0	5Y4/2	0	fr	0	2	f	sbk		SICL	3.1	ST	7.60
WRI-13-07	01-1164	Cg	3.84	128.0	5Y4/2 2.5Y4/4	0	fr	0	2	f	gr		SL	2.3	ST	7.70
WRI-13-01	vf roots, no visible pores, crop remnants visible,															
WRI-13-02	few vf pores, vf roots, few sand grains visible on ped surfaces															
WRI-13-03	common vf pores, vf roots, common sand grains visible on ped surfacers															
WRI-13-04	common vf pores lined with 5YR3/4, vf roots,few clay skins															
WRI-13-05	common vf pores lined with 5YR3/4, 10% oxidized 10YR4/4, common clay skins															
WRI-13-06	few vf pores, 3% oxidized 10YR4/3, few clay skins															
WRI-13-07	no visible pores, 1-2mm stones, fine gravel and sand															

Core Identification	WRI-14							Weather				cool, clear, windy				
Core Location	1650 ft. west and 150ft. South of the northeast corner of Sec. 2, T.90N.,R.25 W.							% slope				0-1				
Collection Date	10/31/2001							Vegetation/Cropping Systems				corn/bean				
Diameter (cm)	3.85							Described by				Beth Larabee				
Length (cm)	117.5							DescriptionDate				9/15/2002				
County	Wright							Classification				Terric Haplosaprist				
									Sturcture							
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	% Total Carbon	Effervescence	pH
WRI-14-01	01-1165	Oap	3.85	10.0	10YR2/1	1	fr	2	1	f	gr	M	A	15.7	NE	4.96
WRI-14-02	01-1166	Oa1	3.85	31.0	10YR3/1	2	fr	3	1 bk. 1	TN bk f	pl bk. Gr	M	C	14.9	NE	3.76
WRI-14-03	01-1167	Oa2	3.85	51.0	10YR2/1	<1	fr	1	1 bk. 1	TN bk f	pl bk. Gr	M	C	10.6	NE	3.94
WRI-14-04	01-1168	2A	3.85	60.0	10YR2/1 2.5Y5/1	0	fr	<1	1	f	gr	SICL	A	5.5	ME	5.09
WRI-14-05	01-1169	2ABg	3.85	70.5	2.5Y4/2 2.5Y4/1 2.5Y3/1	0	fr	0	1	f	sbk	SICL	A	1.8	VS	7.35
WRI-14-06	01-1170	2Bwg	3.85	79.5	2.5Y4/4 2.5Y4/2	0	fr	0	1	f	sbk	SIL	A	2.4	SL	7.48
WRI-14-07	01-1171	2Bt	3.85	98.5	10YR4/6 5Y4/6	0	fr	0	2	f	bk	SIL	A	2.7	SL	7.48
WRI-14-08	01-1172	2C	3.85	117.5	10YR4/6	0	fr	0	none	none	sg	LS		1.1	ST	7.60
WRI-14-01	no pores, vf roots, crop remnants visible															
WRI-14-02	few vf pores, vf roots, sand grains visible on ped surfaces															
WRI-14-03	few vf pores, vf roots, sand grains visible on ped surfaces, fine silt lenxe 2.5Y4/4															
WRI-14-04	common vf pores lined with 10YR3/4															
WRI-14-05	common vf pores lined with 10YR3/4															
WRI-14-06	few vf pores lined with 10YR3/4, few clay skins															
WRI-14-07	common vf pores lined with 10YR3/4, silt lenses 5Y4/2, common clay skins															
WRI-14-08	no pores visible, few silty clay lenses 5Y4/1 in color, coarse sand and sand															

Core Identification	WRI-15							Weather				cool, clear, windy				
Core Location	1650 ft. west and 150ft. South of the northeast corner of Sec. 2, T.90N.,R.25 W.							% slope				0-1				
Collection Date	10/31/2001							Vegetation/Cropping Systems				corn/bean				
Diameter (cm)	3.76							Described by				Beth Larabee				
Length (cm)	113.5							DescriptionDate				9/12/2002				
County	Wright							Classification				Terric Haplosaprist				
									Sturcture							
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	% Total Carbon	Effervescence	pH
WRI-15-01	01-1152	Oa	3.76	41.0	10YR2/1	<1	fr	2	1	f	gr	M	C	13.2	NE	4.41
WRI-15-02	01-1153	2A	3.76	7.5	10YR2/1	<1	fr	1	1 bk 1	VN bk. f	pr bk. Sbk	SI	G	4.9	NE	5.12
WRI-15-03	01-1154	2A	3.76	94.0	10YR2/1	<1	fr	<1	1 bk 1	VN bk. f	pr bk. Sbk	SI	C	3.0	NE	6.96
WRI-15-04	01-1155	2Bw	3.76	104.5	10YR2/1 2.5Y3/1	0	fr	0	1	f	sbk	SIL	A	1.7	NE	7.30
WRI-15-05	01-1156	2Bwg	3.76	113.5	5Y4/2 2.5Y4/1	0	fr	0	1	f	sbk	SICL		2.7	SL	7.57
WRI-15-01	few vf pores, vf roots, crop remnants visible, sand grains visible on ped surfaces															
WRI-15-02	common f and vf pores lined with 7.5YR4/4, vf roots, few sand grains visible on ped surfaces															
WRI-15-03	common vf pores lined with 7.5YR4/4, vf roots, small areas of 10YR2/1															
WRI-15-04	common f and vf pores lined with 7.5YR4/4, small areas of 10YR2/1															
WRI-15-05	few vf pores lined with 7.5YR3/3, small areas of 2.5Y8/2 effervescent															

Core Identification	WRI-16							Weather				cool, clear, windy				
Core Location	1650 ft. west and 150ft. South of the northeast corner of Sec. 2, T.90N.,R.25 W.							% slope				0-1				
Collection Date	10/31/2001							Vegetation/Cropping Systems				corn/bean				
Diameter (cm)	6.38 and 3.82							Described by				Beth Larabee				
Length (cm)	207.5							DescriptionDate				9/12/2002				
County	Wright							Classification				Terric Haplosaprist				
									Sturcture							
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	% Total Carbon	Effervescence	pH
WRI-16-01	01-1173	Oa1	6.38	21.5	10YR2/1	0	fr	2	2	f	gr	M	G	10.2	NE	6.62
WRI-16-02	01-1174	Oa2	6.38	46.5	10YR3/1	0	fi	3	1 bk. 2	VN bk. f	pl bk. Gr	M	G	10.0	NE	5.03
WRI-16-03	01-1175	2A1	6.38	54.0	10YR3/1 10YR3/3	0	fr	1	1 bk. 2	VN bk. f	pl bk. Gr	SIL	C	7.3	NE	4.77
WRI-16-04	01-1176	2A2	6.38	75.0	10YR2/1 10YR2/2	0	fr	<1	1 bk. 2	VN bk. f	pl bk. Gr	SIL	C	6.0	NE	5.22
WRI-16-05	01-1177		6.38	83.0	107YR2/1 10YR4/3	0	fi	0	2	m	sbk	SIL	A	3.5	NE	6.15
WRI-16-06	01-1178		6.38	86.0	10YR2/1 2.5Y5/4	0	fr	0	2 and 2	m and vf	sbk and gr	SIL	A	0.7	NE	6.28
WRI-16-07	01-1179		3.82	95.0	10YR3/2 10YR2/1 2.5Y4/4	0	fi	0	1	f	gr	SIL	A	1.7	NE	6.76
WRI-16-08	01-1180		3.82	128.5	10YR3/1 10YR4/5	0	fi	0	1 bk. 1	none bk. F	m bk. gr	SCL	A	3.2	SL	7.27
WRI-16-09	01-1181		3.82	136.0	10YR3/1 10YR4/5	0	fi	0	1 bk. 2	f bk. Vf	sbk bk. gr	SCL	A	3.4	ST	7.52
WRI-16-10	01-1182		3.82	151.5	10YR4/6 10YR2/2 2.5Y3/2	0	fi	0	1	vf	gr	SIL	C	1.5	SL	7.44
WRI-16-11	01-1183	2Btg	3.82	182.0	10YR2/1 5YR 4/2 2.5Y4/2 2.5Y4/3	0	fi	0	1 bk. 2 and 2	none bk. f and TN	m bk. sbk and pl	SIL	A	4.7	SL	7.36
WRI-16-12	01-1184	2Cg	3.82	194.0	5Y4/1 5Y7/1	0	fi	0	1	w	m	SIL	A	5.2	ST	7.63
WRI-16-13	01-1185	2Cg	3.82	207.5	5Y4/1	0	fi	0	1	w	m	SIL		3.0	SL	7.14
WRI-16-01	few m, f and vf pores, f and vf roots, crop remnants visible, sand grains visible on ped surfaces															
WRI-16-02	small silt lense 10YR4/2, f and vf roots															
WRI-16-03	many vf pores, vf roots, vf silt lenses 10yr4/2 in color, sand grains visible on ped surfaces															
WRI-16-04	vf roots, many vf pores 50% lined with 7.5YR4/4, several large cracks lined with organic materials slicken sides. Very small 10YR4/2 silt lenses.															
WRI-16-05	many vf pores 2mm silt lense 2.5Y5/4															
WRI-16-06	fine powdery, ashy															
WRI-16-07	common vf pores lined wth 7.5YR4/4, few fine mottles 7.5YR 4/4 in color, 5.5 cm ashy layer no effervescence 2.5Y4/4															
WRI-16-08	common vf pores lined wth 7.5YR4/4, snail shell fragments 5Y8/2 in color															
WRI-16-09	common vf pores lined with 7.5YR4/4, whole snail shells and snail shell fragments 5Y8/2 in color															
WRI-16-10	common vf pores lined with 7.5YR4/4, 4cm ashy 10YR4/4 layer															
WRI-16-11	many vf pores lined with 7.5YR4/4, common clay skins															
WRI-16-12	few vf pores 25% lined with 7.5YR4/4, few fine oxidized areas 7.5YR4/4, few snail shell remnants, very fine layers of 5Y7/1															
WRI-16-13	no visible pores, few few snail shell fragments															

Core Identification	WRI-17							Weather				cool, clear, windy				
Core Location	1650 ft. west and 150ft. South of the northeast corner of Sec. 2, T.90N.,R.25 W.							% slope				0-1				
Collection Date	11/1/2001							Vegetation/Cropping Systems				corn/bean				
Diameter (cm)	6.37 and 3.77							Described by				Beth Larabee				
Length (cm)	185.0							DescriptionDate				9/14/2002				
County	Wright							Classification				Typic Calciaquoll				
									Sturcture					% Total		
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH
WRI-17-01	01-1192	Ap	6.37	7.0	10YR2/1	0	fr	<1	1	f	gr	SIL	A	7.2	NE	7.34
WRI-17-02	01-1193	A1	6.37	48.0	10YR2/1	<1	fr	<1	2 bk. 1	M bk. f	pl bk. gr	SIL	C	6.2	NE	7.24
WRI-17-03	01-1194	A2	6.37	68.5	10YR2/1 10YR2/2	0	fr	<1	1 bk. 1	VN bk. f	pl bk. gr	SIL		4.6	NE	6.89
WRI-17-04	01-1195	A3	3.77	81.5	10YR2/1	0	fi	<1	1	f	gr	SIL	C	3.2	NE	7.24
WRI-17-05	01-1196	A4	3.77	108.5	10YR3/1	0	fi	0	1 bk 1	none bk. F	m bk. gr	SICL	A	2.4	NE	7.01
WRI-17-06	01-1197	AB	3.77	116.5	10YR2/1 2.5Y3/2 2.5Y5/2	<1	fi	0	1	none	m	SIL	A	1.2	NE	7.14
WRI-17-07	01-1198	BA	3.77	128.0	10YR2/2 2.5Y5/6 2.5Y4/3	0	fi	0	1	VN	pl	SIL	A	0.4	NE	7.14
WRI-17-08	01-1199	Bwg	3.77	136.0	10YR3/1 2.5Y4/2 2.5Y4/4	0	fi	0	1	vf	gr	SIL	A	0.8	NE	7.37
WRI-17-09	01-1200	Btkg	3.77	170.5	5Y4/3 5Y4/1 2.5Y3/2	0	fr	0	2	m and f	sbk	SIL	C	1.6	NE	7.64
WRI-17-10	01-1201	Btkg	3.77	182.0	5Y4/2 5Y5/2	0	fr	0	2	f	sbk	SI	A	3.6	ST	7.79
WRI-17-11	01-1202	Cg	3.77	185.5	5Y4/2 2.5Y4/3	0	fr	0	1	f	sbk	SI		3.6	SL	7.85
WRI-17-01	no visible pores, vf roots crop remnants visible															
WRI-17-02	no visible pores, vf roots crop remnants visible, few small sand lenses 10YR5/2 in color															
WRI-17-03	many vf pores, vf roots, sand grains visible on ped surfaces, few <1mm sand lenses 10YR5/2															
WRI-17-04	few vf pores lined with 5YR4/4, crop remnants pushed down by previous core															
WRI-17-05	common m, f and vf pores lined with 5YR4/4, sand grains visible on ped surfaces															
WRI-17-06	few vf pores lined with 5YR4/4, sand grains visible on ped surfaces															
WRI-17-07	few m and vf pores lined with 5YR4/6															
WRI-17-08	few vf pores lined with 5YR4/4															
WRI-17-09	common m, f and vf pores lined with 5YR4/6, common clay skins, <1 mm lense 5Y8/2 strongly effervescence															
WRI-17-10	5mm vertical cracks willed with 2.5Y2.5/1 organic material, mandy <1 mm lense 5Y8/2 strongly effervescence															
WRI-17-11	few vf pores lined with 5YR3/4, strong linings in cracks lined wth 5YR3/4															

Core Identification	WRI-19							Weather				cool, clear, windy				
Core Location	1650 ft. west and 150ft. South of the northeast corner of Sec. 2, T.90N.,R.25 W.							% slope				0-1				
Collection Date	11/1/2001							Vegetation/Cropping Systems				corn/bean				
Diameter (cm)	3.86							Described by				Beth Larabee				
Length (cm)	114.0							DescriptionDate				9/24/2002				
County	Wright							Classification				Typic Calciaquoll				
									Sturcture					% Total		
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	Carbon	Effervescence	pH
WRI-19-01	01-1203	Ap	3.86	11.0	10YR2/1	0	fr	1	1	f	gr	SIL	A	2.5	NE	7.68
WRI-19-02	01-1204	A1	3.86	21.0	10YR2/1 5Y4/1	0	fr	<1	2	f	gr	CL	C	0.9	NE	7.58
WRI-19-03	01-1205	A2	3.86	32.0	10YR2/1 5Y4/3 5Y4/1 5Y4/2	0	fr	0	2	f	gr	CL	C	0.6	NE	7.57
WRI-19-04	01-1206	Btg1	3.86	49.0	10YR2/1 5Y4/3 5Y4/1 5Y3/1	0	fr	0	1	f	sbk	SICL	G	0.5	NE	7.39
WRI-19-05	01-1207	Btg2	3.86	73.5	10YR2/1 5Y4/2 5Y3/2	0	fr	0	2	f	sbk	SIL	G	1.0	NE	7.59
WRI-19-06	01-1208	BCg	3.86	92.5	10YR4/6 5Y4/2 2.5Y4/3	0	fr	0	1 bk. none	none bk. none	m bk. Sg	SIL	A	1.3	SL	7.63
WRI-19-07	01-1209	Cg	3.86	114.0	2.5Y5/1 2.5Y5/6	0	fr	0	1 bk. none	none bk. none	m bk. Sg	SL		1.3	SL	7.63
WRI-19-01	few vf pores, vf roots, crop remnants visible, sand grains visible on ped surfaces															
WRI-19-02	few vf pores lined with faint 5YR4/4, vf roots, sand grains visible on ped surfaces															
WRI-19-03	few vf and f pores lined with faint 5YR4/4															
WRI-19-04	many vf pores lined with 5YR4/4, many clay skins															
WRI-19-05	common m, f and vf pores, rare light purple lined pore, 6YR8/2 1mm inclusions few clay skins															
WRI-19-06	many m, f, and vf pores lined with 7.5YR3/4, 20% 5Y8/2 1mm inclusions															
WRI-19-07	few vf pores lined with 7.5Y3/4															

Core Identification	WRI-20							Weather				cool, clear, windy				
Core Location	1650 ft. west and 150ft. South of the northeast corner of Sec. 2, T.90N.,R.25 W.							% slope				0-1				
Collection Date	11/1/2001							Vegetation/Cropping Systems				corn/bean				
Diameter (cm)	3.85							Described by				Beth Larabee				
Length (cm)	109.5							DescriptionDate				9/26/2002				
County	Wright							Classification				Typic Haplaquoll				
									Sturcture							
ID Number	Sample	Horizon	Dia.	Max. Depth	Moist Matrix	% Fiber	Consistance	% Roots	Grade	Size	Shape	Texture	Boundary	% Total Carbon	Effervescence	pH
WRI-20-01	01-1210	A	3.85	28.5	10YR2/1	0	fr	<1	1	f	gr	L	C	4.2	ST	7.79
WRI-20-02	01-1211	A2	3.85	42.5	107R2/1 5Y5/2	0	fr	0	1	f	gr	L	C	3.4	SL	7.85
WRI-20-03	01-1212	A3	3.85	57.0	10YR2/1 10YR3/1 10YR5/2	0	fr	0	1	f	gr	L	G	3.1	SL	8.06
WRI-20-04	01-1213	Bwg	3.85	81.0	107YR3/1 2.5Y5/3 2.5Y5/1	0	fr	0	1	f	sbk	SIL	G	2.7	SL	8.04
WRI-20-05	01-1214	Btg	3.85	101.0	5Y5/2	0	fr	0	1	f	gr	SL	C	2.2	SL	7.95
WRI-20-06	01-1215	Cg	3.85	109.5	5Y5/2 10YR4/6	0	fr	0	1	f	gr	SL		2.5	ST	7.96
WRI-20-01	no visible pores, vf roots, crop remnants visible, sand grains visible on ped surfaces, small areas of 5Y8/2 (<1cm)															
WRI-20-02	few vf pores, small 5Y8/2 stones															
WRI-20-03	common m, f and vf pores, small 5Y8/2 stones															
WRI-20-04	common f and vf pores, some filled with 10YR3/1 and vf pore still visible in the center, few clay skins,															
WRI-20-05	common f and vf pores most pores filled 10YR3/1 and 5Y3/1, 5% oxidized areas 10YR4/5 in color few manganese concretions, common clay skins, few powdery areas 5Y8/2 in color															
WRI-20-06	no visibel pores, few manganese concretions, 10% oxidized 10YR4/5 and 7.5Y4/6 in color															

APPENDIX C SOIL PHYSICAL DATA

Sample Number	Bulk Density	Sample Number	Bulk Density	Sample Number	Bulk Density	Sample Number	Bulk Density
01-0756	0.46	01-0804	0.41	01-0852	1.53	01-0900	1.23
01-0757	0.65	01-0805	0.44	01-0853	1.48	01-0901	0.98
01-0758	0.80	01-0806	0.68	01-0854	1.51	01-0902	0.78
01-0759	1.09	01-0807	0.95	01-0855	1.50	01-0903	1.12
01-0760	1.24	01-0808	0.88	01-0856	1.82	01-0904	1.58
01-0761	1.05	01-0809	1.34	01-0857	1.89	01-0905	1.55
01-0762	0.36	01-0810	1.46	01-0858	1.04	01-0906	1.37
01-0763	0.68	01-0811	1.78	01-0859	1.13	01-0907	0.60
01-0764	0.82	01-0812	1.87	01-0860	1.43	01-0908	0.90
01-0765	1.18	01-0813	1.86	01-0861	1.51	01-0909	0.96
01-0766	1.21	01-0814	1.59	01-0862	1.52	01-0910	1.21
01-0767	1.28	01-0815	0.64	01-0863	1.80	01-0911	1.34
01-0768	0.86	01-0816	0.40	01-0864	0.89	01-0912	1.45
01-0769	0.41	01-0817	0.77	01-0865	2.03	01-0913	1.45
01-0770	0.61	01-0818	0.90	01-0866	2.02	01-0914	0.59
01-0771	0.85	01-0819	0.66	01-0867	1.32	01-0915	0.57
01-0772	1.07	01-0820	0.71	01-0868	0.61	01-0916	0.60
01-0773	1.18	01-0821	0.65	01-0869	1.39	01-0917	0.84
01-0774	1.14	01-0822	1.17	01-0870	1.63	01-0918	1.24
01-0775	0.54	01-0823	1.03	01-0871	0.89	01-0919	1.31
01-0776	0.80	01-0824	1.04	01-0872	0.23	01-0920	1.31
01-0777	0.95	01-0825	1.27	01-0873	0.53	01-0921	1.33
01-0778	1.09	01-0826	1.79	01-0874	0.20	01-0922	0.96
01-0779	1.35	01-0827	0.94	01-0875	0.31	01-0923	1.15
01-0780	1.55	01-0828	1.26	01-0876	1.30	01-0924	1.31
01-0781	1.29	01-0829	1.51	01-0877	0.44	01-0925	1.67
01-0782	0.65	01-0830	1.44	01-0878	0.57	01-0926	1.53
01-0783	0.87	01-0831	1.62	01-0879	1.11	01-0927	1.70
01-0784	0.55	01-0832	1.92	01-0880	1.07	01-0928	1.53
01-0785	0.57	01-0833	0.98	01-0881	0.90	01-0929	0.93
01-0786	0.85	01-0834	1.35	01-0882	1.16	01-0930	1.27
01-0787	1.15	01-0835	1.60	01-0883	0.42	01-0931	1.34
01-0788	1.19	01-0836	1.63	01-0884	0.47	01-0932	1.58
01-0789	1.43	01-0837	1.57	01-0885	0.32	01-0933	1.54
01-0790	1.37	01-0838	1.61	01-0886	0.35	01-0934	1.55
01-0791	1.11	01-0839	1.75	01-0887	0.51	01-0935	0.97
01-0792	0.43	01-0840	1.72	01-0888	0.77	01-0936	1.35
01-0793	0.49	01-0841	1.27	01-0889	0.49	01-0937	1.58
01-0794	0.75	01-0842	1.69	01-0890	0.38	01-0938	1.64
01-0795	0.85	01-0843	1.44	01-0891	0.61	01-0939	1.71
01-0796	1.15	01-0844	1.59	01-0892	0.61	01-0940	1.43
01-0797	1.22	01-0845	0.51	01-0893	0.90	01-0941	0.39
01-0798	1.45	01-0846	0.49	01-0894	0.35	01-0942	0.87
01-0799	1.41	01-0847	0.42	01-0895	0.35	01-0943	1.32
01-0800	0.91	01-0848	0.44	01-0896	0.52	01-0944	1.16
01-0801	0.84	01-0849	0.45	01-0897	0.42	01-0945	1.27
01-0802	0.53	01-0850	0.77	01-0898	0.82	01-0946	1.26
01-0803	0.57	01-0851	0.60	01-0899	1.18	01-0947	0.45

Sample Number	Bulk Density	Sample Number	Bulk Density	Sample Number	Bulk Density	Sample Number	Bulk Density
01-0948	0.88	01-0996	0.35	01-1044	1.12	01-1092	1.07
01-0949	1.30	01-0997	0.83	01-1045	1.07	01-1093	0.63
01-0950	1.31	01-0998	1.46	01-1046	0.33	01-1094	0.56
01-0951	1.22	01-0999	1.78	01-1047	0.59	01-1095	0.81
01-0952	1.21	01-1000	1.62	01-1048	1.36	01-1096	1.10
01-0953	1.23	01-1001	1.91	01-1049	1.03	01-1097	1.06
01-0954	0.41	01-1002	1.66	01-1050	1.00	01-1098	0.53
01-0955	1.06	01-1003	0.39	01-1051	0.93	01-1099	0.61
01-0956	1.25	01-1004	0.44	01-1052	1.22	01-1100	0.85
01-0957	1.37	01-1005	0.43	01-1053	0.35	01-1101	0.89
01-0958	1.23	01-1006	1.29	01-1054	0.24	01-1102	1.00
01-0959	1.17	01-1007	1.71	01-1055	0.41	01-1103	0.84
01-0960	1.03	01-1008	1.66	01-1056	1.12	01-1104	1.30
01-0961	1.52	01-1009	1.76	01-1057	1.43	01-1105	0.69
01-0962	1.46	01-1010	1.32	01-1058	1.34	01-1106	0.54
01-0963	1.48	01-1011	0.51	01-1059	1.29	01-1107	0.78
01-0964	1.85	01-1012	0.50	01-1060	1.36	01-1108	0.98
01-0965	1.05	01-1013	1.31	01-1061	1.37	01-1109	0.98
01-0966	0.92	01-1014	1.59	01-1062	1.30	01-1110	1.28
01-0967	1.57	01-1015	1.21	01-1063	1.31	01-1111	1.09
01-0968	1.63	01-1016	1.19	01-1064	1.54	01-1112	0.72
01-0969	1.58	01-1017	1.08	01-1065	1.56	01-1113	0.60
01-0970	1.78	01-1018	0.57	01-1066	1.72	01-1114	0.87
01-0971	0.69	01-1019	0.43	01-1067	1.52	01-1115	0.28
01-0972	0.90	01-1020	1.08	01-1068	1.36	01-1116	0.82
01-0973	1.92	01-1021	1.15	01-1069	1.48	01-1117	0.93
01-0974	0.64	01-1022	1.26	01-1070	0.68	01-1118	0.20
01-0975	0.86	01-1023	1.26	01-1071	0.61	01-1119	0.23
01-0976	0.47	01-1024	1.35	01-1072	0.61	01-1120	0.98
01-0977	0.67	01-1025	1.99	01-1073	1.03	01-1121	0.79
01-0978	1.08	01-1026	0.48	01-1074	0.92	01-1122	0.95
01-0979	0.95	01-1027	0.40	01-1075	1.30	01-1123	1.47
01-0980	0.98	01-1028	0.97	01-1076	0.71	01-1124	1.54
01-0981	1.08	01-1029	1.29	01-1077	0.60	01-1125	1.70
01-0982	1.19	01-1030	0.86	01-1078	0.86	01-1126	1.76
01-0983	1.16	01-1031	1.39	01-1079	0.88	01-1127	1.45
01-0984	1.21	01-1032	1.30	01-1080	0.96	01-1128	1.72
01-0985	0.45	01-1033	0.43	01-1081	0.92	01-1129	1.57
01-0986	0.91	01-1034	0.46	01-1082	1.13	01-1130	1.49
01-0987	0.96	01-1035	1.01	01-1083	0.59	01-1131	1.59
01-0988	1.24	01-1036	1.01	01-1084	0.62	01-1132	1.70
01-0989	0.65	01-1037	1.08	01-1085	0.25	01-1133	1.56
01-0990	0.44	01-1038	1.24	01-1086	0.74	01-1134	0.74
01-0991	1.14	01-1039	0.30	01-1087	0.89	01-1135	1.16
01-0992	1.86	01-1040	0.66	01-1088	0.99	01-1136	1.74
01-0993	1.95	01-1041	1.21	01-1089	1.01	01-1137	1.39
01-0994	2.12	01-1042	1.40	01-1090	1.00	01-1138	1.66
01-0995	0.43	01-1043	1.14	01-1091	0.53	01-1139	1.15

Sample Number	Bulk Density	Sample Number	Bulk Density	Sample Number	Bulk Density	Sample Number	Bulk Density
01-1140	0.66	01-1188	0.93	01-1236	0.51	01-1284	0.55
01-1141	1.21	01-1189	0.66	01-1237	0.38	01-1285	0.87
01-1142	1.40	01-1190	1.27	01-1238	0.21	01-1286	0.46
01-1143	1.14	01-1191	1.36	01-1239	0.33	01-1287	0.76
01-1144	1.12	01-1192	0.92	01-1240	0.85	01-1288	0.92
01-1145	1.07	01-1193	0.83	01-1241	1.59	01-1289	0.81
01-1146	0.33	01-1194	0.84	01-1242	0.94	01-1290	1.21
01-1147	0.59	01-1195	1.15	01-1243	0.95	01-1291	1.53
01-1148	1.36	01-1196	0.55	01-1244	0.88	01-1292	2.03
01-1149	1.03	01-1197	0.92	01-1245	0.40	01-1293	2.03
01-1150	1.00	01-1198	0.82	01-1246	0.52	01-1294	0.56
01-1151	0.93	01-1199	1.30	01-1247	0.69	01-1295	0.41
01-1152	1.22	01-1200	0.28	01-1248	0.61	01-1296	0.45
01-1153	0.35	01-1201	1.35	01-1249	1.31	01-1297	1.17
01-1154	0.24	01-1202	1.29	01-1250	1.55	01-1298	0.56
01-1155	0.41	01-1203	1.21	01-1251	2.50	01-1299	0.43
01-1156	1.12	01-1204	1.69	01-1252	0.73	01-1300	0.71
01-1157	1.43	01-1205	1.51	01-1253	0.84	01-1301	0.66
01-1158	1.34	01-1206	0.98	01-1254	0.99	01-1302	1.18
01-1159	1.29	01-1207	0.85	01-1255	1.63	01-1303	0.58
01-1160	1.36	01-1208	1.45	01-1256	1.62	01-1304	1.10
01-1161	1.37	01-1209	1.15	01-1257	1.79	01-1305	1.59
01-1162	1.30	01-1210	0.87	01-1258	2.01	01-1306	1.68
01-1163	1.31	01-1211	1.34	01-1259	1.79	01-1307	0.49
01-1164	1.54	01-1212	1.58	01-1260	0.52	01-1308	0.53
01-1165	1.56	01-1213	1.45	01-1261	0.61	01-1309	0.91
01-1166	1.72	01-1214	1.53	01-1262	0.36	01-1310	0.50
01-1167	1.52	01-1215	1.61	01-1263	0.59	01-1311	1.60
01-1168	1.36	01-1216	0.50	01-1264	0.74	01-1312	0.81
01-1169	1.48	01-1217	0.72	01-1265	0.85	01-1313	0.83
01-1170	0.68	01-1218	1.14	01-1266	0.44	01-1314	1.71
01-1171	0.61	01-1219	0.75	01-1267	0.57	01-1315	1.42
01-1172	0.61	01-1220	0.60	01-1268	0.46	01-1316	1.36
01-1173	1.03	01-1221	0.58	01-1269	0.80	01-1317	0.59
01-1174	0.92	01-1222	0.58	01-1270	1.55	01-1318	0.79
01-1175	1.30	01-1223	0.90	01-1271	1.56	01-1319	0.75
01-1176	0.71	01-1224	0.25	01-1272	0.17	01-1320	1.10
01-1177	0.60	01-1225	0.19	01-1273	0.67	01-1321	1.40
01-1178	0.86	01-1226	0.21	01-1274	1.64	01-1322	1.64
01-1179	0.88	01-1227	0.32	01-1275	1.71	01-1323	0.60
01-1180	0.96	01-1228	0.38	01-1276	1.51	01-1324	0.41
01-1181	0.92	01-1229	0.55	01-1277	1.60	01-1325	0.61
01-1182	1.13	01-1230	0.38	01-1278	1.15	01-1326	0.58
01-1183	0.59	01-1231	0.86	01-1279	1.44	01-1327	0.81
01-1184	0.62	01-1232	0.49	01-1280	1.71	01-1328	0.79
01-1185	0.25	01-1233	0.86	01-1281	1.48	01-1329	1.12
01-1186	0.74	01-1234	0.62	01-1282	1.50	01-1330	1.00
01-1187	0.89	01-1235	0.34	01-1283	1.56	01-1331	1.22

Sample Number	Bulk Density	Sample Number	Bulk Density
01-1332	1.59	01-1380	1.62
01-1333	1.48	01-1381	0.40
01-1334	1.64	01-1382	0.74
01-1335	1.70	01-1383	0.87
01-1336	1.90	01-1384	1.07
01-1337	1.63	01-1385	0.98
01-1338	0.41	01-1386	0.79
01-1339	1.15	01-1387	0.94
01-1340	1.38	01-1388	1.17
01-1341	1.28	01-1389	0.48
01-1342	1.26	01-1390	0.48
01-1343	0.88	01-1391	0.32
01-1344	1.21	01-1392	1.18
01-1345	1.50	01-1393	1.31
01-1346	0.65	01-1394	1.90
01-1347	0.60	01-1395	0.43
01-1348	0.64	01-1396	0.52
01-1349	1.64	01-1397	0.42
01-1350	0.16	01-1398	1.22
01-1351	1.38	01-1399	1.42
01-1352	0.46	01-1400	1.62
01-1353	0.44	01-1401	0.39
01-1354	0.76	01-1402	0.43
01-1355	0.90	01-1403	0.40
01-1356	0.53	01-1404	1.16
01-1357	0.36	01-1405	1.56
01-1358	0.53	01-1406	0.71
01-1359	0.78	01-1407	0.65
01-1360	0.94	01-1408	0.37
01-1361	0.54	01-1409	0.59
01-1362	0.43	01-1410	0.91
01-1363	0.37	01-1411	0.72
01-1364	0.79	01-1412	0.67
01-1365	1.03	01-1413	0.41
01-1366	0.61	01-1414	0.98
01-1367	0.43	01-1415	0.63
01-1368	0.56	01-1416	0.36
01-1369	0.81	01-1417	0.58
01-1370	0.97	01-1418	0.56
01-1371	1.01	01-1419	0.43
01-1372	0.84	01-1420	0.83
01-1373	0.56	01-1421	0.34
01-1374	0.35	01-1422	0.39
01-1375	0.35	01-1423	0.95
01-1376	0.88	01-1424	1.01
01-1377	0.48		
01-1378	0.56		
01-1379	0.55		

	Dry			Moist		
ID number	Hue	Value	Chroma	Hue	Value	Chroma
01-0756	3.1RP	4.4	1.3	9.3P	3.9	1.6
01-0757	5.4R	5.3	1.0	0.1RP	4.1	1.6
01-0758	2.8RP	4.4	1.4	8.6P	3.8	1.7
01-0759	6.8RP	4.9	1.1	9.5P	4.0	1.6
01-0760	5.0RP	4.7	1.2	9.0P	3.9	1.6
01-0761	4.9RP	4.7	1.2	9.1P	3.9	1.7
01-0762	4.2RP	4.5	1.3	0.1RP	3.9	1.7
01-0763	1.9R	5.2	1.0	9.6P	3.9	1.6
01-0764	4.3RP	4.5	1.4	9.0P	3.9	1.7
01-0765	5.1RP	4.6	1.2	9.2P	4.0	1.6
01-0766	9.0RP	5.0	1.1	9.8P	4.0	1.5
01-0767	6.9RP	4.9	1.1	9.7P	4.0	1.5
01-0768	9.1RP	5.1	1.0	0.1RP	4.1	1.6
01-0769	2.8RP	4.4	1.3	9.1P	3.9	1.6
01-0770	3.6RP	5.2	1.0	0.1RP	4.1	1.6
01-0771	2.6RP	4.5	1.3	8.8P	4.0	1.6
01-0772	2.8RP	4.8	1.3	7.6P	4.1	1.7
01-0773	5.7RP	5.2	1.1	7.9P	4.2	1.7
01-0775	6.0P	7.1	2.5	5.5P	5.8	2.9
01-0776	9.2P	7.7	1.9	6.3P	6.2	2.8
01-0777	9.9P	7.9	1.8	6.5P	6.3	2.8
01-0778	9.1P	7.7	1.9	6.2P	6.0	2.7
01-0779	1.5RP	8.1	1.8	5.2P	6.6	2.7
01-0780	4.4RP	8.4	1.6	8.1P	6.6	2.2
01-0781	7.9RP	9.1	1.3	8.7P	7.2	2.2
01-0782	0.5RP	8.0	1.8	6.8P	6.1	2.7
01-0783	4.5RP	8.4	1.5	8.5P	7.0	2.1
01-0784	7.0P	7.0	2.5	5.3P	6.1	3.3
01-0785	9.7P	7.5	2.0	5.4P	6.2	3.2
01-0786	3.8RP	8.3	1.6	6.7P	6.6	2.9
01-0787	9.1P	7.5	2.0	6.0P	6.4	3.0
01-0788	9.0P	7.6	2.0	5.7P	6.4	3.0
01-0789	6.2RP	9.0	1.3	4.4RP	6.3	1.7
01-0790	2.0RP	8.4	1.6	5.9	6.8	2.4
01-0791	0.6R	8.7	1.4	0.RP	7.0	2.2
01-0792	6.6P	6.9	2.6	4.7P	6.0	3.4
01-0793	7.6P	7.1	2.4	4.9P	6.2	3.5
01-0794	9.9P	7.7	1.9	6.1P	6.5	3.1
01-0795	8.6P	7.6	2.0	5.1P	6.2	3.1
01-0796	8.3P	7.5	2.1	5.8P	6.5	3.1
01-0797	9.5P	7.8	1.9	6.0P	6.5	3.0
01-0798	4.8RP	8.4	1.6	6.5P	6.9	2.6
01-0799	10.0R	10.3	1.1	1.9RP	7.9	1.7
01-0800	10.0RP	9.5	1.1	7.8P	7.3	2.1
01-0801	1.5RP	9.6	1.1	8.5P	7.3	2.0
01-0802	6.3P	6.9	2.7	6.1P	6.3	3.1
01-0803	6.5P	6.8	2.7	4.9P	6.2	3.4
01-0804	6.3P	6.8	2.6	6.6P	5.9	2.9
01-0805	7.0P	7.0	2.5	3.9P	5.8	3.3
01-0806	7.5P	7.2	2.3	4.4P	6.1	3.5
01-0807	3.4RP	8.5	1.5	6.6P	6.7	2.7
01-0808	5.5P	7.3	2.2	3.6P	6.0	3.3
01-0809	6.5P	7.2	2.4	3.3P	5.9	3.2
01-0810	6.5P	7.3	2.3	4.5P	6.3	3.2
01-0811	3.3RP	9.1	0.9	8.0P	7.3	1.9
01-0812	1.2RP	8.7	1.1	6.3P	7.0	2.1
01-0813	1.0RP	9.4	0.8	8.2P	7.3	1.6
01-0814	1.2RP	8.7	1.2	8.0P	6.5	1.9
01-0815	5.7P	6.8	2.7	3.3P	5.7	3.4
01-0816	6.5P	7.1	2.4	3.7P	6.0	3.7
01-0817	8.2P	7.5	2.0	4.8P	6.4	3.2
01-0818	7.3P	7.4	2.1	4.6P	6.2	3.2
01-0819	9.5P	7.8	1.7	5.1P	6.4	3.1

	Dry			Moist		
ID number	Hue	Value	Chroma	Hue	Value	Chroma
01-0819	9.5P	7.8	1.7	5.1P	6.4	3.1
01-0820	1.1RP	8.8	0.9	6.0P	6.8	2.2
01-0821	8.3P	7.4	2.1	5.1P	6.3	3.1
01-0822	4.8RP	8.8	1.2	6.5P	6.9	2.4
01-0823	10.0P	7.8	1.7	6.3P	6.6	2.6
01-0824	3.7RP	8.4	1.4	6.5P	6.8	2.5
01-0825	4.2YR	10.4	0.8	2.2RP	7.8	1.5
01-0826	2.2YR	9.8	0.8	9.1P	7.4	1.7
01-0827	6.0P	7.1	2.3	5.3P	6.4	3.1
01-0828	7.9P	7.9	1.6	5.9P	6.6	2.5
01-0829	4.3R	9.3	0.9	9.1P	7.4	1.8
01-0830	1.3RP	9.6	0.7	9.5P	7.4	1.7
01-0831	10.0R	10.2	0.6	2.6RP	8.0	1.3
01-0832	1.9YR	10.0	0.7	3.3RP	7.8	1.4
01-0833	6.8P	7.1	2.4	3.4P	6.0	3.5
01-0834	6.6P	7.5	2.0	5.2P	6.4	2.9
01-0835	7.1P	7.7	1.8	5.4P	6.4	2.8
01-0836	5.6R	9.3	0.8	1.9RP	7.5	1.5
01-0837	3.8YR	9.6	1.0	3.9RP	7.6	1.5
01-0838	7.2YR	10.2	1.4	7.9RP	7.7	1.5
01-0839	6.0YR	10.4	1.0	6.0RP	8.0	1.4
01-0840	7.9YR	10.6	1.3	7.6RP	7.9	1.4
01-0841	6.9P	7.3	2.2	5.3P	6.4	3.1
01-0842	7.4P	7.5	2.0	5.2P	6.3	2.9
01-0843	3.1RP	9.1	0.9	8.5P	7.3	1.7
01-0844	4.8YR	9.8	0.9	1.5RP	7.4	1.5
01-0845	6.7P	7.0	2.4	4.5P	6.2	3.3
01-0846	6.1P	6.9	2.5	4.4P	6.1	3.4
01-0847	7.2P	7.0	2.4	4.4P	6.1	3.4
01-0848	6.3P	7.1	2.4	4.6P	6.3	3.2
01-0849	1.8RP	8.4	1.4	5.9P	6.5	2.8
01-0850	9.3P	7.9	1.7	5.0P	6.1	2.9
01-0851	6.2P	7.0	2.5	4.5P	6.0	3.3
01-0852	1.6RP	8.0	1.7	6.1P	6.4	2.9
01-0853	6.9RP	8.9	1.1	8.0P	7.1	2.1
01-0854	1.0YR	9.8	0.9	0.1RP	7.4	1.8
01-0855	4.7YR	9.4	2.0	6.7RP	7.4	1.9
01-0856	3.1YR	9.9	1.1	3.3RP	7.7	1.6
01-0857	4.8YR	9.2	2.1	6.3RP	7.4	2.1
01-0859	7.9P	8.2	1.6	5.5P	6.6	2.9
01-0860	7.2P	7.8	1.8	6.4P	6.6	2.7
01-0861	1.4RP	9.4	0.8	0.2RP	7.4	1.7
01-0862	3.5YR	10.1	0.8	7.2RP	8.0	1.1
01-0863	5.8YR	10.1	1.0	10.0RP	7.9	1.3
01-0864	8.1P	7.5	1.9	6.6P	6.4	2.8
01-0864	1.6YR	9.7	0.8	1.4RP	7.6	1.4
01-0865	2.4YR	9.3	2.1	10.0RP	7.7	2.0
01-0865	1.8YR	9.2	1.2	0.8RP	7.3	1.9
01-0866	5.6R	8.3	1.8	2.9RP	7.2	2.1
01-0867	2.7YR	9.2	2.0	7.0RP	7.4	2.0
01-0868	7.3P	7.2	2.2	6.1P	6.4	2.9
01-0869	9.6R	8.7	1.8	7.6RP	7.5	2.2
01-0870	0.8RP	8.1	1.5	7.0P	6.8	2.4
01-0871	6.7P	7.0	2.5	5.1P	6.3	3.2
01-0872	6.4P	6.9	2.5	8.2P	4.6	2.8
01-0873	7.0P	6.8	2.6	6.3P	5.1	2.9
01-0874	7.2P	7.2	2.2	5.0P	6.2	3.3
01-0875	10.0RP	9.1	1.1	6.1P	6.9	2.4
01-0876	9.9P	8.0	1.6	6.0P	6.5	2.9
01-0877	0.2RP	4.7	1.5	7.6P	4.2	1.8
01-0878	2.9RP	4.9	1.3	7.6P	4.2	1.8
01-0879	1.6RP	4.8	1.4	7.6P	4.2	1.8
01-0880	3.3RP	5.3	1.0	8.0P	4.4	1.6

	Dry			Moist		
ID number	Hue	Value	Chroma	Hue	Value	Chroma
01-0880	3.3RP	5.3	1.0	8.0P	4.4	1.6
01-0881	8.6RP	5.9	0.8	8.4P	4.4	1.6
01-0882	5.0RP	5.6	0.9	8.6P	4.5	1.5
01-0883	6.0P	6.8	2.7	4.8P	5.5	2.6
01-0884	6.4P	6.8	2.6	3.8P	6.0	3.5
01-0885	7.5P	7.0	2.3	6.4P	5.8	2.9
01-0886	8.9P	7.4	2.0	5.9P	6.4	3.0
01-0887	9.7P	7.8	1.7	6.1P	6.5	3.0
01-0888	6.1P	7.0	2.4	5.4P	6.3	3.1
01-0889	6.4P	6.8	2.5	5.3P	6.0	3.1
01-0890	8.8P	7.3	2.1	5.3P	6.2	3.1
01-0891	9.5P	7.7	1.8	5.4P	6.4	3.1
01-0892	8.0P	7.3	2.1	5.0P	6.2	3.2
01-0893	10.0P	8.0	1.6	6.3P	6.6	2.8
01-0894	6.9P	7.1	2.4	6.7P	5.7	2.7
01-0895	0.4RP	7.5	2.0	1.9RP	5.0	2.3
01-0896	8.8P	7.0	2.3	6.4P	6.2	3.1
01-0897	0.4RP	7.5	2.1	6.3P	6.2	3.0
01-0898	0.3RP	7.4	2.2	6.6P	6.4	2.9
01-0899	3.3RP	8.1	16.0	7.6P	6.7	2.5
01-0900	8.6R	9.5	1.2	5.2RP	7.3	1.6
01-0901	2.0YR	9.2	1.7	4.0RP	7.1	2.1
01-0902	9.2P	7.1	2.2	5.5P	6.0	3.1
01-0903	2.0RP	7.7	1.9	6.0P	6.4	2.9
01-0904	1.0RP	7.9	1.8	7.8P	6.1	2.0
01-0905	4.5YR	9.8	2.1	0.3R	7.5	2.0
01-0906	10.0R	9.6	1.2	4.0RP	7.6	1.7
01-0907	7.7P	6.8	2.5	5.5P	6.1	3.2
01-0908	9.5P	7.1	2.2	6.7P	6.2	3.1
01-0909	9.6P	7.1	2.2	6.4P	6.3	3.0
01-0910	1.5RP	7.9	1.8	6.6P	6.6	2.6
01-0911	0.1YR	9.8	1.2	4.8RP	7.7	1.7
01-0912	1.9YR	9.4	1.7	6.4RP	7.4	2.0
01-0913	2.7YR	9.8	1.5	7.0RP	7.6	1.7
01-0914	8.1P	6.9	2.3	6.2P	6.1	3.0
01-0915	10.0P	7.2	2.1	6.3P	6.2	2.9
01-0916	10.0RP	8.7	1.4	0.1RP	6.9	2.3
01-0917	10.0P	7.3	2.0	6.1P	6.2	3.1
01-0918	1.8RP	8.1	1.6	7.0P	6.7	2.5
01-0919	10.0R	9.9	1.1	3.9RP	7.6	1.6
01-0920	2.8YR	9.8	1.5	6.7RP	7.6	1.6
01-0921	2.3YR	9.1	2.2	4.4RP	7.0	2.2
01-0922	3.0RP	4.3	1.4	9.0P	3.8	1.7
01-0923	3.1RP	4.4	1.4	9.0P	3.8	1.7
01-0924	3.8RP	4.4	1.4	9.3P	3.9	1.7
01-0925	5.5RP	4.6	1.3	0.1RP	3.9	1.7
01-0926	0.5R	5.1	1.1	0.6RP	4.1	1.6
01-0927	5.7R	5.3	1.0	0.9RP	4.2	1.5
01-0928	1.4YR	5.7	1.0	3.7RP	4.4	1.3
01-0929	2.3RP	4.3	1.4	9.0P	3.9	1.7
01-0930	3.0RP	4.4	1.4	9.1P	3.9	1.6
01-0931	4.7RP	4.6	1.3	9.5P	3.9	1.6
01-0932	3.6RP	4.5	1.3	9.1P	3.9	1.7
01-0933	6.6RP	4.7	1.2	0.5RP	4.0	1.6
01-0934	0.6R	5.0	1.1	0.5RP	4.1	1.6
01-0935	2.9RP	4.3	1.4	9.0P	3.8	1.7
01-0936	3.3RP	4.4	1.3	9.3P	3.9	1.6
01-0937	4.7RP	4.5	1.3	9.2P	3.8	1.7
01-0938	6.9RP	4.8	1.1	0.7RP	4.0	1.6
01-0939	2.5R	5.2	1.0	0.9RP	4.1	1.6
01-0940	4.9YR	6.2	1.0	7.5RP	4.5	1.2
01-0941	9.6P	4.4	1.5	7.5P	4.1	1.8
01-0942	1.0RP	4.6	1.4	7.5P	4.0	1.8

	Dry			Moist		
ID number	Hue	Value	Chroma	Hue	Value	Chroma
01-0942	1.0RP	4.6	1.4	7.5P	4.0	1.8
01-0943	0.7R	5.6	0.9	9.0P	4.2	1.6
01-0944	6.5YR	6.8	0.8	2.7RP	4.7	1.2
01-0945	7.7YR	6.8	1.9	3.8R	5.0	1.3
01-0946	7.9YR	6.9	1.2	0.3R	5.1	1.8
01-0947	8.9P	4.0	1.5	6.8P	4.2	1.7
01-0948	0.6RP	4.6	1.4	7.6P	4.1	1.7
01-0949	0.7R	5.7	0.8	9.2P	4.3	1.5
01-0950	7.7YR	7.1	0.7	4.9RP	5.0	1.0
01-0951	8.2YR	7.1	1.1	6.3RP	5.0	1.1
01-0952	9.6YR	7.1	0.9	8.7RP	5.1	0.9
01-0953	8.3YR	7.0	1.9	5.0R	5.1	1.3
01-0954	8.9P	4.6	1.4	6.2P	4.2	1.7
01-0955	0.1RP	4.7	1.3	3.3P	4.2	1.7
01-0956	8.0RP	5.6	0.8	9.3P	4.5	1.3
01-0957	1.8YR	6.4	0.6	1.5RP	4.8	1.2
01-0958	7.3YR	7.0	0.8	4.1RP	5.0	1.0
01-0960	6.5P	7.1	2.5	4.5P	5.9	3.1
01-0961	7.5P	7.3	2.3	4.6P	6.3	3.2
01-0962	7.2P	8.2	1.5	6.1P	6.8	2.5
01-0963	10.0P	8.6	1.1	6.1P	6.9	2.3
01-0966	5.8P	7.0	2.4	5.3P	6.3	3.1
01-0967	9.9P	8.1	1.4	6.0P	6.8	2.5
01-0968	0.4YR	9.9	0.8	1.9RP	7.7	1.5
01-0969	0.9YR	9.1	2.3	3.6RP	7.5	2.0
01-0970	4.5YR	9.8	2.0	3.9RP	7.4	2.0
01-0971	5.8P	7.0	2.4	3.6P	5.4	2.8
01-0972	6.9P	7.0	2.3	5.9P	6.2	3.0
01-0973	10.0P	8.0	1.5	6.1P	6.6	2.7
01-0974	2.7RP	9.3	0.8	9.2P	7.3	1.7
01-0975	4.7YR	9.8	2.5	6.2RP	7.4	2.1
01-0976	3.7YR	9.5	2.1	4.6RP	7.4	2.1
01-0977	0.1RP	4.5	1.5	7.8P	4.1	1.6
01-0978	2.4RP	4.8	1.4	7.5P	4.2	1.8
01-0979	2.2RP	4.9	1.3	7.2P	4.3	1.8
01-0980	4.5RP	5.2	1.0	7.9P	4.4	1.6
01-0981	0.6R	5.7	0.9	8.7P	4.5	1.5
01-0982	10.0RP	5.8	0.8	8.5P	4.5	1.5
01-0983	6.6RP	6.2	0.7	8.8P	4.5	1.5
01-0984	6.3YR	6.7	0.9	2.6RP	4.7	1.3
01-0985	7.6P	7.2	2.3	5.3P	6.1	3.2
01-0986	0.3RP	7.6	2.0	6.8P	6.1	2.8
01-0987	3.4RP	8.0	1.7	7.2P	6.6	2.6
01-0988	6.7RP	8.5	1.6	8.5P	6.8	2.4
01-0989	9.7P	4.6	1.3	6.7P	4.2	1.7
01-0989	1.2R	5.4	1.0	7.9P	4.1	1.8
01-0990	1.1RP	4.7	1.3	7.2P	4.2	1.7
01-0991	4.9RP	5.0	1.1	7.8P	4.3	1.6
01-0992	0.9YR	6.0	0.8	3.2RP	4.8	1.2
01-0993	10.0R	5.8	0.9	3.6RP	4.7	1.2
01-0994	3.4YR	6.2	0.9	3.8RP	4.8	1.2
01-0995	8.9P	4.5	1.4	6.1P	4.1	1.8
01-0996	9.9P	4.4	1.5	6.6P	3.9	2.0
01-0997	2.5RP	4.7	1.4	7.6P	4.0	1.9
01-0998	8.4RP	5.4	1.0	9.7P	4.3	1.5
01-0999	10.0R	5.9	0.8	0.1RP	4.3	1.6
01-1000	8.0RP	5.8	0.8	1.8RP	4.5	1.4
01-1001	2.8YR	6.3	0.8	3.8RP	4.7	1.2
01-1002	1.4YR	6.0	0.8	4.4RP	4.8	1.2
01-1003	8.9P	4.4	1.5	6.6P	4.0	1.9
01-1004	9.2P	4.3	1.6	6.5P	3.9	2.0
01-1005	0.9RP	4.6	1.5	7.3P	4.0	1.9
01-1006	4.6RP	5.0	1.1	8.6P	4.2	1.6

	Dry			Moist		
ID number	Hue	Value	Chroma	Hue	Value	Chroma
01-0880	3.3RP	5.3	1.0	8.0P	4.4	1.6
01-0881	8.6RP	5.9	0.8	8.4P	4.4	1.6
01-0882	5.0RP	5.6	0.9	8.6P	4.5	1.5
01-0883	6.0P	6.8	2.7	4.8P	5.5	2.6
01-0884	6.4P	6.8	2.6	3.8P	6.0	3.5
01-0885	7.5P	7.0	2.3	6.4P	5.8	2.9
01-0886	8.9P	7.4	2.0	5.9P	6.4	3.0
01-0887	9.7P	7.8	1.7	6.1P	6.5	3.0
01-0888	6.1P	7.0	2.4	5.4P	6.3	3.1
01-0889	6.4P	6.8	2.5	5.3P	6.0	3.1
01-0890	8.8P	7.3	2.1	5.3P	6.2	3.1
01-0891	9.5P	7.7	1.8	5.4P	6.4	3.1
01-0892	8.0P	7.3	2.1	5.0P	6.2	3.2
01-0893	10.0P	8.0	1.6	6.3P	6.6	2.8
01-0894	6.9P	7.1	2.4	6.7P	5.7	2.7
01-0895	0.4RP	7.5	2.0	1.9RP	5.0	2.3
01-0896	8.8P	7.0	2.3	6.4P	6.2	3.1
01-0897	0.4RP	7.5	2.1	6.3P	6.2	3.0
01-0898	0.3RP	7.4	2.2	6.6P	6.4	2.9
01-0899	3.3RP	8.1	16.0	7.6P	6.7	2.5
01-0900	8.6R	9.5	1.2	5.2RP	7.3	1.6
01-0901	2.0YR	9.2	1.7	4.0RP	7.1	2.1
01-0902	9.2P	7.1	2.2	5.5P	6.0	3.1
01-0903	2.0RP	7.7	1.9	6.0P	6.4	2.9
01-0904	1.0RP	7.9	1.8	7.8P	6.1	2.0
01-0905	4.5YR	9.8	2.1	0.3R	7.5	2.0
01-0906	10.0R	9.6	1.2	4.0RP	7.6	1.7
01-0907	7.7P	6.8	2.5	5.5P	6.1	3.2
01-0908	9.5P	7.1	2.2	6.7P	6.2	3.1
01-0909	9.6P	7.1	2.2	6.4P	6.3	3.0
01-0910	1.5RP	7.9	1.8	6.6P	6.6	2.6
01-0911	0.1YR	9.8	1.2	4.8RP	7.7	1.7
01-0912	1.9YR	9.4	1.7	6.4RP	7.4	2.0
01-0913	2.7YR	9.8	1.5	7.0RP	7.6	1.7
01-0914	8.1P	6.9	2.3	6.2P	6.1	3.0
01-0915	10.0P	7.2	2.1	6.3P	6.2	2.9
01-0916	10.0RP	8.7	1.4	0.1RP	6.9	2.3
01-0917	10.0P	7.3	2.0	6.1P	6.2	3.1
01-0918	1.8RP	8.1	1.6	7.0P	6.7	2.5
01-0919	10.0R	9.9	1.1	3.9RP	7.6	1.6
01-0920	2.8YR	9.8	1.5	6.7RP	7.6	1.6
01-0921	2.3YR	9.1	2.2	4.4RP	7.0	2.2
01-0922	3.0RP	4.3	1.4	9.0P	3.8	1.7
01-0923	3.1RP	4.4	1.4	9.0P	3.8	1.7
01-0924	3.8RP	4.4	1.4	9.3P	3.9	1.7
01-0925	5.5RP	4.6	1.3	0.1RP	3.9	1.7
01-0926	0.5R	5.1	1.1	0.6RP	4.1	1.6
01-0927	5.7R	5.3	1.0	0.9RP	4.2	1.5
01-0928	1.4YR	5.7	1.0	3.7RP	4.4	1.3
01-0929	2.3RP	4.3	1.4	9.0P	3.9	1.7
01-0930	3.0RP	4.4	1.4	9.1P	3.9	1.6
01-0931	4.7RP	4.6	1.3	9.5P	3.9	1.6
01-0932	3.6RP	4.5	1.3	9.1P	3.9	1.7
01-0933	6.6RP	4.7	1.2	0.5RP	4.0	1.6
01-0934	0.6R	5.0	1.1	0.5RP	4.1	1.6
01-0935	2.9RP	4.3	1.4	9.0P	3.8	1.7
01-0936	3.3RP	4.4	1.3	9.3P	3.9	1.6
01-0937	4.7RP	4.5	1.3	9.2P	3.8	1.7
01-0938	6.9RP	4.8	1.1	0.7RP	4.0	1.6
01-0939	2.5R	5.2	1.0	0.9RP	4.1	1.6
01-0940	4.9YR	6.2	1.0	7.5RP	4.5	1.2
01-0941	9.6P	4.4	1.5	7.5P	4.1	1.8
01-0942	1.0RP	4.6	1.4	7.5P	4.0	1.8

	Dry			Moist		
ID number	Hue	Value	Chroma	Hue	Value	Chroma
01-0942	1.0RP	4.6	1.4	7.5P	4.0	1.8
01-0943	0.7R	5.6	0.9	9.0P	4.2	1.6
01-0944	6.5YR	6.8	0.8	2.7RP	4.7	1.2
01-0945	7.7YR	6.8	1.9	3.8R	5.0	1.3
01-0946	7.9YR	6.9	1.2	0.3R	5.1	1.8
01-0947	8.9P	4.0	1.5	6.8P	4.2	1.7
01-0948	0.6RP	4.6	1.4	7.6P	4.1	1.7
01-0949	0.7R	5.7	0.8	9.2P	4.3	1.5
01-0950	7.7YR	7.1	0.7	4.9RP	5.0	1.0
01-0951	8.2YR	7.1	1.1	6.3RP	5.0	1.1
01-0952	9.6YR	7.1	0.9	8.7RP	5.1	0.9
01-0953	8.3YR	7.0	1.9	5.0R	5.1	1.3
01-0954	8.9P	4.6	1.4	6.2P	4.2	1.7
01-0955	0.1RP	4.7	1.3	3.3P	4.2	1.7
01-0956	8.0RP	5.6	0.8	9.3P	4.5	1.3
01-0957	1.8YR	6.4	0.6	1.5RP	4.8	1.2
01-0958	7.3YR	7.0	0.8	4.1RP	5.0	1.0
01-0960	6.5P	7.1	2.5	4.5P	5.9	3.1
01-0961	7.5P	7.3	2.3	4.6P	6.3	3.2
01-0962	7.2P	8.2	1.5	6.1P	6.8	2.5
01-0963	10.0P	8.6	1.1	6.1P	6.9	2.3
01-0966	5.8P	7.0	2.4	5.3P	6.3	3.1
01-0967	9.9P	8.1	1.4	6.0P	6.8	2.5
01-0968	0.4YR	9.9	0.8	1.9RP	7.7	1.5
01-0969	0.9YR	9.1	2.3	3.6RP	7.5	2.0
01-0970	4.5YR	9.8	2.0	3.9RP	7.4	2.0
01-0971	5.8P	7.0	2.4	3.6P	5.4	2.8
01-0972	6.9P	7.0	2.3	5.9P	6.2	3.0
01-0973	10.0P	8.0	1.5	6.1P	6.6	2.7
01-0974	2.7RP	9.3	0.8	9.2P	7.3	1.7
01-0975	4.7YR	9.8	2.5	6.2RP	7.4	2.1
01-0976	3.7YR	9.5	2.1	4.6RP	7.4	2.1
01-0977	0.1RP	4.5	1.5	7.8P	4.1	1.6
01-0978	2.4RP	4.8	1.4	7.5P	4.2	1.8
01-0979	2.2RP	4.9	1.3	7.2P	4.3	1.8
01-0980	4.5RP	5.2	1.0	7.9P	4.4	1.6
01-0981	0.6R	5.7	0.9	8.7P	4.5	1.5
01-0982	10.0RP	5.8	0.8	8.5P	4.5	1.5
01-0983	6.6RP	6.2	0.7	8.8P	4.5	1.5
01-0984	6.3YR	6.7	0.9	2.6RP	4.7	1.3
01-0985	7.6P	7.2	2.3	5.3P	6.1	3.2
01-0986	0.3RP	7.6	2.0	6.8P	6.1	2.8
01-0987	3.4RP	8.0	1.7	7.2P	6.6	2.6
01-0988	6.7RP	8.5	1.6	8.5P	6.8	2.4
01-0989	9.7P	4.6	1.3	6.7P	4.2	1.7
01-0989	1.2R	5.4	1.0	7.9P	4.1	1.8
01-0990	1.1RP	4.7	1.3	7.2P	4.2	1.7
01-0991	4.9RP	5.0	1.1	7.8P	4.3	1.6
01-0992	0.9YR	6.0	0.8	3.2RP	4.8	1.2
01-0993	10.0R	5.8	0.9	3.6RP	4.7	1.2
01-0994	3.4YR	6.2	0.9	3.8RP	4.8	1.2
01-0995	8.9P	4.5	1.4	6.1P	4.1	1.8
01-0996	9.9P	4.4	1.5	6.6P	3.9	2.0
01-0997	2.5RP	4.7	1.4	7.6P	4.0	1.9
01-0998	8.4RP	5.4	1.0	9.7P	4.3	1.5
01-0999	10.0R	5.9	0.8	0.1RP	4.3	1.6
01-1000	8.0RP	5.8	0.8	1.8RP	4.5	1.4
01-1001	2.8YR	6.3	0.8	3.8RP	4.7	1.2
01-1002	1.4YR	6.0	0.8	4.4RP	4.8	1.2
01-1003	8.9P	4.4	1.5	6.6P	4.0	1.9
01-1004	9.2P	4.3	1.6	6.5P	3.9	2.0
01-1005	0.9RP	4.6	1.5	7.3P	4.0	1.9
01-1006	4.6RP	5.0	1.1	8.6P	4.2	1.6

	Dry			Moist		
ID number	Hue	Value	Chroma	Hue	Value	Chroma
01-1124	8.3P	6.0	0.7	0.9RP	4.7	1.6
01-1125	1.8YR	6.3	0.6	1.2RP	4.8	1.2
01-1126	8.7R	6.0	0.7	1.5RP	4.8	1.2
01-1127	9.8P	4.6	1.4	6.8P	4.1	1.9
01-1128	1.5RP	5.0	1.3	7.3P	4.1	1.5
01-1129	8.7RP	5.5	1.9	0.1RP	4.5	1.6
01-1130	0.6YR	6.1	0.7	0.7RP	4.5	1.4
01-1131	5.6YR	6.4	0.8	6.3RP	4.9	1.1
01-1132	4.4YR	6.3	0.8	3.2RP	4.7	1.3
01-1133	7.3YR	6.4	1.4	1.8RP	5.0	1.3
01-1134	0.3RP	4.7	1.5	7.4P	4.2	1.8
01-1135	10.0P	4.7	1.4	6.8P	4.1	1.9
01-1136	3.1YR	6.3	0.8	3.7RP	4.7	1.3
01-1137	7.9YR	6.4	1.7	8.5RP	4.7	1.3
01-1138	6.4YR	6.3	1.2	4.1RP	4.7	1.3
01-1139	9.2P	4.6	1.4	7.2P	4.2	1.8
01-1140	9.8P	4.9	1.3	7.6P	4.2	1.8
01-1141	2.7RP	5.4	1.0	8.7P	4.4	1.6
01-1142	7.2RP	5.7	0.9	0.1RP	4.6	1.5
01-1143	7.0R	5.9	0.8	3.2RP	4.7	1.3
01-1144	3.0YR	6.2	0.8	2.9RP	4.7	1.3
01-1145	7.8YR	6.7	1.3	8.4RP	4.9	1.2
01-1146	8.1YR	6.5	1.4	737RP	4.9	1.2
01-1147	1.0RP	4.7	1.4	7.5P	4.2	1.8
01-1148	0.9RP	4.8	1.4	6.9P	4.2	1.8
01-1149	5.4YR	6.7	0.9	1.3RP	4.7	1.4
01-1150	7.5YR	6.5	1.2	4.5RP	4.8	1.2
01-1151	1.6YR	5.8	0.8	2.7RP	4.7	1.3
01-1152	O.8RP	4.7	1.4	7.5P	4.3	1.7
01-1152	2.1RP	4.9	1.3	7.3P	4.3	1.7
01-1153	1.3RP	4.8	1.4	6.8P	4.2	1.8
01-1153	2.8RP	4.9	1.3	2.4P	4.0	1.9
01-1154	3.1RP	5.0	1.3	6.9P	4.2	1.8
01-1154	0.8RP	4.8	1.4	7.5P	4.1	1.9
01-1155	1.0RP	4.8	1.4	7.9P	4.4	1.6
01-1155	1.2R	5.3	1.2	9.1P	4.2	1.7
01-1156	2.9RP	5.1	1.2	7.3P	4.3	1.8
01-1156	10.0R	6.0	0.9	1.5RP	4.6	1.4
01-1157	3.8RP	5.1	1.1	7.3P	4.2	1.8
01-1158	9.8P	4.5	1.5	7.6P	4.2	1.8
01-1159	1.0RP	4.6	1.5	8.7P	4.4	1.6
01-1160	1.1RP	4.8	1.4	6.9P	4.3	1.7
01-1161	6.7RP	5.4	1.0	8.0P	4.4	1.6
01-1162	4.4RP	6.0	1.0	3.4RP	4.7	1.3
01-1163	9.1YR	6.7	1.8	5.7RP	4.7	1.3
01-1164	8.2YR	6.3	1.8	6.0RP	4.6	1.4
01-1165	1.1RP	4.7	1.8	7.8P	4.3	1.7
01-1166	3.2RP	4.9	1.4	7.9P	4.3	1.7
01-1167	1.6RP	4.8	1.4	7.4P	4.3	1.7
01-1168	1.9RP	4.8	1.4	7.5P	4.3	1.8
01-1169	2.3RP	5.7	0.9	9.4P	4.4	1.6
01-1170	1.2YR	6.1	0.8	0.5RP	4.6	1.4
01-1171	8.8YR	6.7	1.4	2.4RP	4.6	11.4
01-1172	5.6YR	6.1	1.2	2.8RP	4.6	1.4
01-1173	21.RP	4.9	1.3	7.3P	4.3	1.7
01-1173	2.1RP	4.3	1.5	9.2P	3.6	1.6
01-1174	6.5RP	4.7	1.3	9.3P	3.8	1.7
01-1175	7.9RP	4.8	1.2	0.1RP	3.9	1.8
01-1176	8.1RP	4.8	1.3	9.4P	3.8	1.7
01-1177	8.8RP	4.8	1.2	8.9P	3.7	1.7
01-1178	5.8YR	6.2	1.3	8.9RP	4.6	1.3
01-1179	2.7YR	5.8	1.1	5.2RP	4.0	1.3
01-1180	8.2RP	4.9	1.1	8.4P	3.7	1.7

	Dry			Moist		
ID number	Hue	Value	Chroma	Hue	Value	Chroma
01-1180	8.2RP	4.9	1.1	8.4P	3.7	1.7
01-1181	8.4RP	5.0	1.1	8.7P	3.9	1.7
01-1182	0.3YR	5.5	1.2	2.5RP	4.1	1.6
01-1183	3.2YR	5.8	1.1	7.3RP	4.2	1.3
01-1184	5.8YR	6.4	1.0	8.6RP	4.6	1.1
01-1192	2.7RP	4.3	1.5	9.5P	3.4	1.5
01-1193	4.2RP	4.5	1.4	8.9P	3.6	1.7
01-1194	6.2RP	4.6	1.3	9.0P	3.7	1.7
01-1195	4.7RP	4.5	1.3	9.3P	3.8	1.6
01-1196	6.8RP	4.7	1.2	9.1P	3.8	1.7
01-1197	8.4RP	4.7	1.3	9.7P	3.7	1.6
01-1198	4.9YR	6.0	1.2	8.3RP	4.4	1.4
01-1199	4.5RP	5.0	1.2	1.5RP	3.9	1.7
01-1200	4.3YR	5.8	1.1	9.3RP	4.2	1.2
01-1201	5.2YR	6.2	1.0	0.5RP	4.6	1.2
01-1202	5.7YR	5.8	1.2	9.1RP	4.3	1.3
01-1203	1.9RP	4.3	1.4	8.8P	3.5	1.6
01-1204	3.8RP	4.6	1.2	9.5P	3.8	1.6
01-1205	7.5RP	4.9	1.1	0.8RP	4.0	1.6
01-1206	10.0R	5.4	0.8	5.7RP	4.1	1.2
01-1207	4.0YR	9.2	1.4	0.3R	7.0	1.7
01-1208	2.4YR	9.1	1.6	7.4RP	7.4	1.9
01-1209	1.7YR	9.1	1.4	5.0RP	7.1	1.8
01-1210	7.2P	7.1	2.3	6.1P	6.1	2.9
01-1211	7.5P	7.4	2.1	6.6P	6.5	2.7
01-1212	0.1RP	8.2	1.6	7.5P	6.8	2.4
01-1213	6.8RP	8.9	1.1	10.0P	7.2	1.9
01-1214	5.3YR	9.8	1.8	0.8RP	7.7	1.8
01-1215	5.3YR	9.7	2.2	4.5RP	7.7	2.0
01-1216	2.0RP	4.7	1.4	7.8P	4.1	1.8
01-1217	1.9RP	4.7	1.4	7.5P	4.1	1.8
01-1218	1.1RP	4.7	1.4	7.6P	4.1	1.8
01-1219	0.1RP	4.5	1.6	7.5P	4.0	1.9
01-1220	9.5P	4.6	1.3	6.3P	4.2	1.7
01-1221	9.6P	4.5	1.4	6.2P	4.1	1.8
01-1222	2.4RP	4.9	1.2	6.2P	4.1	1.7
01-1223	5.5RP	5.0	1.2	6.7P	4.1	1.8
01-1224	9.9P	4.4	1.5	7.3P	4.1	1.8
01-1225	2.3RP	4.7	1.4	7.6P	4.1	1.8
01-1226	3.5RP	4.9	1.3	7.9P	4.1	1.8
01-1227	1.0RP	4.6	1.5	7.4P	4.1	1.8
01-1228	3.8RP	5.0	1.2	7.5P	4.1	1.8
01-1229	7.6P	6.8	2.5	6.7P	5.5	2.4
01-1230	9.7P	6.9	2.5	0.1RP	5.0	2.8
01-1231	6.7RP	8.5	1.5	7.8P	6.5	2.3
01-1232	1.6RP	7.7	1.9	6.6P	5.9	2.8
01-1233	2.1RP	8.0	1.8	6.7P	6.4	2.7
01-1234	1.6RP	7.7	1.9	8.2P	5.7	2.4
01-1235	10.0P	7.3	2.0	10.0P	6.1	2.2
01-1236	2.7RP	7.5	2.0	1.9RP	5.9	2.3
01-1237	10.0P	7.4	1.9	6.8P	5.5	2.3
01-1238	0.1RP	7.4	2.1	6.2P	6.1	2.7
01-1239	0.2RP	7.7	1.7	6.6P	6.1	2.4
01-1240	0.5RP	8.7	1.1	8.5P	6.9	2.1
01-1241	3.0YR	9.5	1.4	4.6RP	7.2	1.9
01-1242	9.9P	7.5	2.0	5.9P	6.3	3.0
01-1243	0.4RP	7.8	1.9	6.5P	6.5	2.9
01-1244	0.1RP	7.9	1.8	6.0P	6.5	2.8
01-1245	2.1RP	7.9	1.8	3.5P	5.6	2.2
01-1246	2.7RP	7.8	1.7	6.5P	6.1	2.6
01-1253	8.0P	7.2	2.2	6.1P	6.4	2.7
01-1254	7.3P	7.1	2.3	6.0P	6.3	3.0
01-1255	4.3R	8.9	1.2	1.6RP	7.5	1.9

	Dry			Moist		
ID number	Hue	Value	Chroma	Hue	Value	Chroma
01-1255	4.3R	8.9	1.2	1.6RP	7.5	1.9
01-1256	3.6YR	9.9	1.2	6.0RP	7.8	1.6
01-1257	2.7YR	9.4	1.9	7.7RP	7.6	1.9
01-1258	1.3YR	9.2	1.6	5.4RP	7.5	1.9
01-1259	3.3YR	9.8	1.2	5.2RP	7.7	1.6
01-1260	8.6P	4.5	1.4	6.2P	4.1	1.8
01-1261	8.9P	4.4	1.4	6.1P	4.0	1.8
01-1262	9.4P	4.4	1.5	6.3P	4.1	1.8
01-1263	2.5RP	4.8	1.3	6.3P	3.9	1.6
01-1264	3.1RP	4.8	1.3	7.5P	4.0	1.9
01-1265	2.2RP	4.6	1.4	6.7P	4.0	1.9
01-1266	7.7P	6.9	2.4	6.5P	6.1	2.9
01-1267	7.6P	6.9	2.5	6.8P	5.4	2.7
01-1268	7.9P	6.7	2.1	6.1P	5.4	2.6
01-1269	10.0P	7.2	2.1	7.2P	5.6	2.8
01-1270	5.8RP	9.1	1.2	0.7RP	7.2	2.0
01-1271	1.2YR	8.9	2.9	5.2RP	7.1	2.5
01-1272	7.9RP	9.1	1.2	1.3RP	7.2	2.0
01-1273	5.7P	7.0	2.5	5.0P	5.9	3.1
01-1274	2.9RP	8.4	1.3	7.3P	7.0	2.2
01-1275	0.5YR	9.7	0.9	2.9RP	7.7	1.6
01-1276	8.3R	9.5	1.0	10.0P	7.2	1.8
01-1277	1.7YR	9.5	1.5	2.2RP	7.4	2.1
01-1278	8.6P	7.4	2.0	6.0P	6.4	2.9
01-1279	9.3P	7.6	1.9	6.4P	6.5	2.8
01-1280	4.4R	9.7	0.9	2.0RP	7.6	1.7
01-1281	7.6RP	9.5	1.0	3.6RP	7.7	1.7
01-1282	5.0YR	10.4	1.0	6.9RP	7.9	1.4
01-1283	6.6YR	10.0	1.9	0.8RP	7.6	1.8
01-1284	8.4P	7.1	2.2	6.0P	6.0	3.0
01-1285	8.9P	7.1	2.2	6.1P	5.7	2.8
01-1286	7.4P	6.7	2.5	6.2P	5.6	3.0
01-1287	1.1RP	7.6	2.0	6.5P	6.3	3.0
01-1288	0.9RP	7.8	1.9	6.1P	6.4	2.9
01-1289	1.4RP	7.7	1.9	6.1P	6.3	2.9
01-1290	100YR	9.6	1.2	2.9RP	7.4	1.8
01-1291	2.7YR	9.4	1.4	4.4RP	7.3	1.8
01-1292	2.9YR	9.2	1.7	5.2YR	7.4	2.0
01-1293	1.3YR	9.4	1.3	2.2RP	7.3	1.9
01-1294		6.8	2.6	5.1P	5.5	2.9
01-1295	6.6P	6.6	2.7	6.0P	5.5	3.0
01-1296	6.2P	6.8	2.8	7.2P	5.1	2.9
01-1297	7.7P	7.4	2.1	5.2P	6.1	2.9
01-1298	6.1P	6.7	2.6	5.8P	5.7	3.0
01-1299	6.3P	6.6	2.7	5.3P	5.9	3.1
01-1300	7.4P	6.8	2.5	5.7P	6.0	3.1
01-1301	7.8P	6.9	2.4	5.7P	6.1	3.1
01-1302	9.9P	7.2	2.1	6.4P	6.3	3.0
01-1303	7.0P	6.7	2.6	6.2P	5.5	2.9
01-1304	0.9RP	8.8	1.3	10.0P	7.1	2.0
01-1305	10.0R	8.9	1.8	2.8RP	7.1	2.2
01-1306	5.2RP	9.1	1.1	9.5P	7.0	2.0
01-1307	5.9P	6.8	2.7	5.5P	6.1	2.9
01-1308	6.2P	6.8	2.6	5.6P	5.7	3.0
01-1309	8.8P	7.3	2.1	6.3P	6.4	3.0
01-1310	6.1P	6.8	2.6	5.3P	5.7	2.9
01-1311	3.1RP	8.3	1.3	6.5P	6.8	2.4
01-1312	6.0P	6.9	2.6	5.5P	5.7	2.7
01-1313	6.4P	6.9	2.5	5.9P	6.0	3.0
01-1314	8.3P	7.4	2.0	6.0P	6.4	2.9
01-1315	0.5RP	8.1	1.6	7.8P	6.6	2.4
01-1316	9.8P	7.8	1.7	6.2P	6.6	2.5
01-1317	6.1P	6.9	2.5	5.9P	5.7	2.6

	Dry			Moist		
ID number	Hue	Value	Chroma	Hue	Value	Chroma
01-1317	6.1P	6.9	2.5	5.9P	5.7	2.6
01-1318	6.4P	6.9	2.5	5.9P	5.9	2.7
01-1319	7.8P	7.1	2.3	5.3P	5.9	2.9
01-1320	1.0RP	7.8	1.9	6.5P	6.5	2.9
01-1321	9.8R	9.8	0.9	1.3RP	7.5	1.7
01-1322	2.8YR	9.6	2.3	5.3RP	7.5	2.1
01-1323	6.1P	6.8	2.6	5.3P	5.4	2.6
01-1324	8.5P	7.1	2.2	6.7P	5.9	2.9
01-1325	1.0RP	7.8	1.8	5.8P	6.1	2.8
01-1326	5.0RP	9.4	1.1	1.5RP	7.4	2.0
01-1327	0.1RP	7.8	1.9	6.3P	6.5	2.9
01-1328	4.0RP	7.9	1.7	6.7P	6.5	2.6
01-1329	7.1R	9.3	1.0	9.5P	7.2	1.9
01-1330	10.P	8.1	1.5	6.1P	6.5	2.8
01-1331	1.2RP	8.6	1.4	5.8P	6.7	2.7
01-1332	7.3RP	9.4	1.1	8.8P	7.4	2.1
01-1333	7.9RP	9.6	1.2	2.5RP	7.5	1.9
01-1334	1.4YR	9.5	1.5	4.1RP	7.4	2.0
01-1335	3.8YR	9.9	1.7	8.1RP	7.8	1.9
01-1336	3.7YR	9.4	2.1	5.8RP	7.4	2.1
01-1337	2.6YR	9.2	1.7	6.2RP	7.5	2.0
01-1338	6.8P	6.8	2.6	5.3P	5.8	3.0
01-1339	6.5P	6.7	2.8	5.1P	5.6	3.1
01-1340	8.3P	7.5	2.0	5.0P	6.4	3.1
01-1341	10.0P	8.1	1.5	5.9P	6.5	2.8
01-1342	8.0R	9.3	1.2	2.2RP	7.4	2.0
01-1343	4.5RP	8.6	1.3	7.1P	6.9	2.3
01-1344	2.1YR	10.2	0.7	1.5RP	7.8	1.5
01-1345	7.9RP	9.7	0.8	0.1RP	7.7	1.7
01-1346	6.6P	6.9	2.6	6.7P	5.0	2.8
01-1347	5.8P	6.8	2.8	4.6P	5.9	3.2
01-1348	5.7P	6.9	2.7	6.2P	5.3	2.9
01-1349	8.5R	9.5	1.1	0.7RP	7.4	1.9
01-1350	1.1YR	9.7	1.2	2.2RP	7.2	1.8
01-1351	0.6YR	9.0	1.8	0.1RP	7.0	2.3
01-1352	7.1P	7	2.5	6.2P	6.3	3.1
01-1353	8.5P	7.1	2.5	5.4P	6.1	3.2
01-1354	0.5RP	7.8	1.9	6.0P	6.3	3.0
01-1356	6.0P	6.8	2.7	6.0P	6.2	2.9
01-1357	6.6P	6.8	2.7	7.4P	6.3	2.7
01-1358	7.5P	7.3	2.2	6.0P	6.4	3.1
01-1359	9.2P	7.6	1.9	6.1P	6.6	2.9
01-1360	1.8RP	8.0	1.8	6.1P	6.6	2.9
01-1361	7.2P	7.1	2.4	4.0P	5.5	3.1
01-1362	7.9P	7.1	2.4	6.7P	6.1	2.9
01-1364	2.5RP	8.0	1.7	7.0P	6.7	2.7
01-1365	9.4P	7.3	2.2	8.0P	5.7	2.7
01-1365	8.4P	7.0	2.3	6.2P	6.4	2.9
01-1366	7.0P	7.0	2.5	6.2P	6.1	3.0
01-1367	8.8P	7.2	2.3	10.0P	5.0	2.6
01-1368	9.3P	7.3	2.2	5.6P	5.8	2.8
01-1369	1.1RP	7.9	1.9	6.6P	6.4	2.8
01-1370	1.3RP	8.0	1.8	6.1P	6.5	2.8
01-1371	1.5RP	7.8	2.0	6.5P	6.6	2.8
01-1372	2.3RP	8.1	1.8	6.6P	6.6	2.8
01-1373	3.8RP	8.4	1.7	6.7P	6.7	2.8
01-1374	8.1RP	8.3	1.8	2.0RP	6.2	2.5
01-1375	4.7RP	8.0	1.6	4.7P	6.1	2.9
01-1376	2.9RP	8.8	1.2	8.5P	7.0	2.3
01-1389	7.3P	7.0	2.5	6.1P	5.5	3.0
01-1390	7.1P	6.8	2.6	5.3P	5.8	3.0
01-1391	8.4P	6.9	2.5	9.7P	4.5	2.8
01-1392	10.0P	7.6	2.0	5.5P	6.2	2.9

	Dry			Moist		
ID number	Hue	Value	Chroma	Hue	Value	Chroma
01-1392	10.0P	7.6	2.0	5.5P	6.2	2.9
01-1393	10.0RP	9.3	1.1	7.7P	7.2	2.2
01-1394	1.8YR	9.9	1.2	3.7RP	7.7	1.7
01-1394.5	4.6YR	10.1	2.9	7.7RP	7.4	2.5
01-1395	6.5P	6.9	2.6	6.0P	5.6	2.9
01-1396	7.3P	7.0	2.4	5.5P	5.8	2.9
01-1397	7.5P	6.9	2.6	7.0P	5.6	2.9
01-1398	9.5P	7.7	1.9	6.0P	6.5	3.0
01-1399	2.0YR	10.2	0.9	4.9RP	7.9	1.5
01-1400	8.9R	9.3	1.4	5.2RP	7.7	1.9
01-1401	6.0P	6.9	2.6	6.6P	5.9	2.9
01-1402	6.3P	6.8	2.7	5.9P	5.7	2.9
01-1403	7.9P	7.0	2.5	5.7P	6.0	3.2
01-1404	0.1RP	7.8	2.0	5.8P	6.4	3.1
01-1405	4.7YR	10.4	1.4	4.1RP	7.6	1.7
01-1406	0.7YR	9.2	3.6	6.3RP	7.2	3.0
01-1407	7.9P	7.1	2.3	9.5R	4.8	2.5
01-1408	8.6P	7.0	2.4	8.1P	5.3	2.8
01-1409	9.7P	7.3	2.1	9.6P	4.9	2.6
01-1410	0.8P	7.9	1.9	7.3P	6.7	2.7
01-1411	1.7RP	8.0	1.8	7.7P	6.8	2.6
01-1412	4.1RP	8.2	1.7	8.1P	6.8	2.6
01-1413	6.8RP	8.3	1.7	4.5RP	5.7	2.2
01-1413	2.6RP	8.0	1.8	7.9P	6.7	2.7
01-1414	6.9RP	8.7	1.4	7.7P	6.7	2.5
01-1415	2.2RP	7.9	1.9	6.9P	6.6	2.8
01-1416	6.4RP	8.2	1.8	8.2P	6.7	2.6
01-1417	6.3RP	8.3	1.6	8.0P	6.6	2.4
01-1418	5.4RP	8.7	1.4	2.3RP	5.9	1.4
01-1419	8.4P	7.0	2.3	6.2P	6.4	2.9
01-1420	5.3RP	8.3	1.7	7.1P	6.7	2.7
01-1421	5.7RP	8.2	1.8	8.5P	6.7	2.6
01-1422	10.0RP[	8.3	1.6	7.4P	6.6	2.5
01-1423	7.4R	9.0	1.3	9.9P	6.4	1.6
01-1424	0.6YR	9.6	1.1	9.1P	6.9	1.7

Sample Number	Loss on Ignition	Sample Number	Loss on Ignition	Sample Number	Loss on Ignition	Sample Number	Loss on Ignition	Sample Number	Loss on Ignition
01-0756	20.80%	01-0894	62.00%	01-1093	34.60%	01-1242	14.40%	01-1357	60.20%
01-0762	29.20%	01-0895	17.80%	01-1094	25.60%	01-1245	39.40%	01-1358	26.00%
01-0769	29.80%	01-0896	34.20%	01-1098	36.20%	01-1246	27.40%	01-1361	44.60%
01-0775	33.60%	01-0897	20.60%	01-1099	29.00%	01-1247	39.20%	01-1362	45.00%
01-0784	37.60%	01-0907	21.40%	01-1100	23.00%	01-1248	28.60%	01-1363	39.20%
01-0785	24.20%	01-0914	3.00%	01-1105	36.00%	01-1260	31.00%	01-1366	45.40%
01-0792	39.60%	01-0915	22.00%	01-1106	27.20%	01-1261	33.40%	01-1367	43.60%
01-0793	33.00%	01-0941	33.40%	01-1112	27.00%	01-1262	34.80%	01-1368	31.80%
01-0802	37.60%	01-0947	34.80%	01-1113	17.60%	01-1263	24.60%	01-1373	20.20%
01-0803	36.80%	01-0954	31.60%	01-1115	63.80%	01-1266	37.00%	01-1374	39.00%
01-0804	40.60%	01-0960	19.40%	01-1118	63.60%	01-1267	41.20%	01-1375	34.40%
01-0805	34.00%	01-0971	34.00%	01-1119	50.80%	01-1268	38.60%	01-1376	15.80%
01-0806	23.20%	01-0972	33.40%	01-1146	25.80%	01-1269	20.60%	01-1377	39.00%
01-0815	34.00%	01-0977	35.60%	01-1152	29.40%	01-1270	3.60%	01-1378	31.00%
01-0816	42.00%	01-0978	21.20%	01-1158	45.00%	01-1273	26.00%	01-1379	24.80%
01-0817	20.60%	01-0985	33.00%	01-1159	42.40%	01-1274	3.20%	01-1389	44.40%
01-0818	16.20%	01-0989	36.40%	01-1160	19.40%	01-1284	23.20%	01-1390	45.60%
01-0819	24.60%	01-0990	27.60%	01-1165	35.40%	01-1285	26.60%	01-1391	49.80%
01-0820	10.00%	01-0995	37.00%	01-1166	32.80%	01-1286	36.60%	01-1395	44.20%
01-0821	28.40%	01-0996	35.80%	01-1167	23.20%	01-1287	14.00%	01-1396	43.00%
01-0845	37.60%	01-1003	38.20%	01-1173	24.60%	01-1294	34.60%	01-1397	39.80%
01-0846	44.20%	01-1003	38.80%	01-1174	22.80%	01-1295	43.20%	01-1401	44.60%
01-0847	45.80%	01-1004	39.00%	01-1186	36.20%	01-1296	45.60%	01-1402	45.40%
01-0848	39.40%	01-1005	33.00%	01-1187	23.80%	01-1297	9.20%	01-1403	37.40%
01-0849	21.00%	01-1011	49.20%	01-1188	11.20%	01-1298	34.00%	01-1407	44.20%
01-0850	18.60%	01-1012	40.00%	01-1189	28.40%	01-1299	43.00%	01-1408	47.80%
01-0851	31.80%	01-1018	48.60%	01-1216	27.80%	01-1300	26.00%	01-1409	31.20%
01-0868	25.80%	01-1019	41.40%	01-1217	24.00%	01-1303	37.80%	01-1412	21.00%
01-0871	40.60%	01-1026	46.20%	01-1219	31.20%	01-1304	3.60%	01-1413	38.40%
01-0872	47.20%	01-1027	37.80%	01-1220	30.00%	01-1305	2.60%	01-1416	39.60%
01-0873	48.60%	01-1033	36.20%	01-1221	25.20%	01-1307	43.20%	01-1417	32.40%
01-0874	12.00%	01-1034	25.60%	01-1222	19.20%	01-1308	44.00%	01-1418	30.00%
01-0875	10.40%	01-1039	56.60%	01-1224	33.40%	01-1310	42.00%	01-1419	46.00%
01-0877	36.60%	01-1046	52.20%	01-1225	26.40%	01-1311	7.20%	01-1421	34.20%
01-0878	23.00%	01-1047	19.40%	01-1126	24.00%	01-1312	43.20%	01-1422	32.60%
01-0883	36.80%	01-1053	58.00%	01-1129	38.20%	01-1313	20.40%	01-1417	32.40%
01-0884	42.40%	01-1054	57.60%	01-1230	46.80%	01-1317	30.80%	01-1418	30.00%
01-0885	48.20%	01-1055	28.60%	01-1231	9.60%	01-1318	33.40%	01-1419	46.00%
01-0886	42.00%	01-1070	46.60%	01-1232	26.00%	01-1319	26.60%	01-1421	34.20%
01-0887	27.60%	01-1071	16.80%	01-1233	10.60%	01-1323	43.40%	01-1422	32.60%
01-0888	36.40%	01-1072	19.20%	01-1234	23.80%	01-1324	38.20%		
01-0889	47.60%	01-1076	35.80%	01-1235	52.00%	01-1325	18.40%		
01-0890	39.80%	01-1077	13.60%	01-1236	40.80%	01-1338	28.40%		
01-0891	19.60%	01-1083	34.00%	01-1237	34.80%	01-1339	34.00%		
01-0892	28.20%	01-1084	27.20%	01-1238	31.00%	01-1340	6.20%		
01-0893	20.20%	01-1091	25.80%	01-1239	25.40%	01-1346	38.80%		
01-0894	62.00%	01-1093	34.60%	01-1242	14.40%	01-1347	41.20%		
01-0895	17.80%	01-1094	25.60%	01-1245	39.40%	01-1348	35.80%		
01-0896	34.20%	01-1098	36.20%	01-1246	27.40%	01-1352	45.20%		
01-0897	20.60%	01-1099	29.00%	01-1247	39.20%	01-1353	40.60%		
01-0907	21.40%	01-1100	23.00%	01-1248	28.60%	01-1356	45.20%		

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Halleluiah!

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The End.